TRANSMITTAL LETTER

June 13, 2014

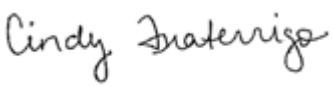
Re: RFP for Provision of Consulting Actuarial Services

As requested, we are including this Transmittal Letter in our response to your RFP for Provision of Consulting Actuarial Services dated May 12, 2014.

The enclosed proposal contains all the required items in Section X, "Contents of Proposal", which includes the following:

- A description of our firm, qualifications, approach and work plan as specified by the RFP
- Compensation for the requested services
- A copy of PwC's Certificate of Compliance from the State of MN Department of Human Rights (Affirmative Action)
- Samples of our work product

As a principal and actuary with PwC, Cindy Fraterrigo is authorized to make commitments, including financial ones, on behalf of PwC for all aspects of this RFP. Submitting this proposal does not indicate our agreement with any particular terms and conditions. As we have done in all other engagements, we expect to negotiate mutually agreeable terms appropriate for an actuarial services contract.



Cindy Fraterrigo, FSA, EA, MAAA

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Minnesota Legislative Commission on Pensions and Retirement

June 13, 2014

Proposal to Provide Consulting Actuarial Services

June 13, 2014

Mr. Lawrence A. Martin
Executive Director
Minnesota Legislative Commission on Pensions and Retirement
55 State Office Building
100 Rev. Dr. Martin Luther King Jr. Blvd.
St. Paul, MN 55155

Re: Proposal to Provide Consulting Actuarial Services

Dear Mr. Martin,

We are pleased to present our proposal to provide consulting actuarial services to the Minnesota Legislative Commission on Pensions and Retirement ("Commission"). This letter and enclosed proposal describe our firm, qualifications, approach and work plan, and the commitment the Commission can expect from PricewaterhouseCoopers LLP ("PwC") throughout this engagement.

Based on our review of the request for proposal ("RFP"), as well as our knowledge of and experience with retirement and benefits programs of similar size and complexity in the public sector, we understand your goal to procure the services of an experienced actuarial consulting firm that will act as an actuarial advisor to the Commission. We also understand the Commission is seeking an actuarial consultant to perform "audit" type procedures over the annual actuarial valuations of twelve statewide and major local pension plans. As an accounting firm, we must clarify that the "audit" procedures we are proposing to provide and which are stated in the RFP include a review or replication of the annual actuarial valuations for each plan, and that those procedures do not constitute an attest or audit engagement in accordance with Generally Accepted Audit Standards.

Finally, we understand that the scope of services requested will also include presentations to the Commission and providing insight from an actuarial perspective to the Commisson and Commission staff through a range of other actuarial services including:

- Reviewing the Commission's Standards for Actuarial Work
- Reviewing the quadrennial experience studies for the three largest plans
- Reviewing actuarial cost estimates of proposed legislation
- Reviewing optional annuity form tables
- Reviewing annuity reserve factor changes
- Reviewing prior service credit purchase payment amount determinations
- Additional actuarial services on an as-needed basis.

The services requested in the RFP will be delivered by PwC's Global Human Resource Services ("GHRS") practice. GHRS includes a network of retirement benefits actuaries and other professionals who deliver a wide range of retirement consulting services to a diverse list of clients, including public sector employers and pension systems. In addition, GHRS practitioners routinely provided specialist assistance to our audit practice by reviewing actuarial valuations, assumptions, and accounting related to defined benefit pension plans that are sponsored by our audit clients. We are therefore very accustomed to working collaboratively with other actuaries for the benefit of our clients. We believe that our experience on both the consulting and auditing side of pension benefits makes us uniquely qualified to deliver the services requested by the Commission.

We are excited to demonstrate how PwC can bring value through:

- **Breadth of Knowledge** — At PwC, we can draw on industry-leading expertise in a wide variety of disciplines such as accounting, process improvement, consulting and other disciplines which are not generally available from other actuarial consulting firms. Our actuarial professionals are well-versed in the many issues facing today's governments and they know how to translate complex, numerical results into understandable, concise and actionable ideas for improvement.

- **Commitment to Your Business** — Whereas many of our competitors have scaled back or exited the public sector, PwC has expanded and continues to invest additional resources in the public sector. Our commitment has been well-received in the marketplace, as evidenced by a number of successful proposals. We continue to actively recruit talent in the marketplace and anticipate a continuing expansion of staff and service offerings in the future.

- **Highly Experienced Professionals** — As the human resources and actuarial issues facing governmental entities are constantly changing, different combinations of skills are needed to find effective solutions. That is why PwC has assembled a team of our top professionals to handle your needs. Cindy Fraterrigo, the primary actuary for this engagement, and Brandon Robertson, the secondary actuary for this engagement, are active in the public sector and currently co-lead engagements with the Indiana Public Retirement System and the Missouri Public School and Public Education Retirement Systems. Cindy and Brandon will lead the core engagement team that includes three Fellows of Society of Actuaries, and two Associates of the Society of Actuaries.

- **Experience with Actuarial "Audit" Projects** — As noted above, PwC's GHRS practice, including Cindy, Brandon, and the other actuarial staff assigned to this engagement, are routinely involved in audit projects. Our GHRS practice is called upon to provide a review of actuarial assumptions, actuarial valuations, and retirement plan accounting applications whenever PwC is the auditor of an entity that sponsors a defined benfit retirement plan. It is not uncommon for our practitioners to spend several hundred hours each year on audit related projects.

  Our GHRS practice is frequently engaged to review and replicate the work of other actuaries in a non-finanical statement audit context as well. When we are engaged for specialized projects concerning financial management, pension asset/liability modeling, and innovative retirement plan design, we often must first review and replicate the work of another actuary before proceding with our own strategic analysis. For example, we have recently been engaged to review

the work of other actuaries in developing a unique plan design for two separate law firms, because of our recognized expertise in the marketplace in that arena.

Finally, we have performed similar actuarial review and replication for public sector entities. For example, prior to becoming the consulting actuary for Missouri PSRS and PEERS, Brandon Robertson was involved in completing an actuarial "audit" of the prior actuary's work. Cindy and Brandon also performed a replication of the prior actuary's work before taking over as consulting actuary to the Indiana Public Retirement System.

As a Principal and actuary with PwC I, Cindy Fraterrigo, am authorized to make commitments, including financial ones, on behalf of PwC for all aspects of this RFP. Submitting this proposal does not indicate our agreement with any particular terms and conditions. As we have done in all other engagements, we expect to negotiate mutually agreeable terms appropriate for an actuarial services contract.

We appreciate the opportunity to offer our services. If you have any questions, please contact me at (312) 298-4320.

Cindy Fraterrigo

Cindy Fraterrigo, FSA, EA, MAAA

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Minimum Qualification Standards and Important Qualification Factors

Minimum Qualification Standards and Important Qualification Factors

The Commission requires that the actuarial firm to be retained must meet the definition of an approved actuary in Minnesota Statutes, Section 356.215, which requires a fellow of the Society of Actuaries.

The Commission also will consider the following elements in retaining a reviewing or auditing consulting actuarial firm:

1) *Sufficient Firm Size. The extent to which the consulting actuarial firm has the capability to meet the Commission's needs as well as the needs of any other firm clients is an important factor.*

PwC employs more than 180,000 professionals in 158 countries around the world, including approximately 500 professionals devoted to the delivery of retirement actuarial services. Within the United States PwC currently employs more than 100 credentialed actuaries located in 7 offices, all of whom are Fellows of the Society of Actuaries, Associates of the Society of Actuaries, or Enrolled Actuaries and all are Members of the American Academy of Actuaries.

PwC has a long history of providing actuarial services for a wide range of client organizations dating back to 1961. Since that time, our Global Human Resource Services ("GHRS") practice the has become the largest actuarial, employee benefits, and compensation practice among the Big Four international accounting firms and ranks among the largest human resource consultancies in the world. Given the size of our GHRS practice and the number of practitioners with the proper credentials and skill set to deliver the services requested, PwC has the capability and capacity to meet the Commission's needs as well as meeting the needs of our other current clients.

In order to provide unrivaled service to the Commission, we have assigned the following team for this engagement

Name	Engagement Role	PwC Staff Level
Cindy Fraterrigo, FSA, EA, MAAA	Primary Actuary	Principal
Brandon Robertson, ASA, EA, MAAA	Secondary Actuary	Director
Jack Abraham, FSA, EA, MAAA	Peer Review, Primary/Secondary Back Up	Principal
Gina Uhrich, FSA, EA, MAAA	Project Manager	Manager
Kyle Sherlock, ASA, MAAA	Project Manager Back Up	Manager
Caroline Bowden	Lead Actuarial Staff	Senior Associate
Carolyn Steger	Actuarial Staff	Associate

Cindy Fraterrigo, as the primary actuary on the engagement, meets the definition of an approved actuary in Minnesota Statues, Section 356.215.

Cindy Fraterrigo, Brandon Robertson, and Gina Uhrich will be the core actuarial team, leading the engagement and serving as the primary points of contact for the Commission. In addition, Jack Abraham and Kyle Sherlock will maintain familiarity with the engagement and be available for peer review and back up during busy periods and in the absence of the core actuaries on an engagement. Caroline Bowden and Carolyn Steger will be the actuarial staff assigned to the engagement. Other actuarial staff will assist as needed during busy periods and in the absence of the assigned staff. This duplication approach to service delivery provides proper expertise and availability to answer any questions or complete any projects you may have at any time. Short biographies for each team member are provided in item 3 below.

As dictated by the circumstances of the engagement, the core engagement team may also call upon other practitioners with a particular area of expertise that would be beneficial to the Commission. Below are a few of the specialists who have assisted our core teams on other public sector engagements:

Name	Specialist Knowledge	PwC Staff Level
Marty Hill, FSA, MAAA	OPEB Actuarial Consulting	Director
Teresa Yannacone, CPA	GASB Accounting	Director
Isaac Buchen	Pension Risk Management and Asset Consulting	Principal
Charlie Yovino, JD, LLM	Operational Risk Management, Governance, and Compliance	Principal

2) *Prior Public Pension Experience by Actuarial Firm. The experience of the actuarial firm in evaluating and forecasting the financial condition of large defined benefit pension plans for public employees is an important factor.*

Retirement plan sponsorship today entails more challenges and more opportunities than ever before. Change is being driven by significant financial concerns around the cost of benefits, new HR strategies, enabling technologies, new laws and financial reporting requirements, demographics, and the volatility of retirement assets. PwC has assisted clients with innovative retirement plan designs to address changing demographics and identified new funding mechanisms to help retirement systems adequately fund the promised benefits. Employees are contributing greater amounts to defined contribution plans. As a result, issues of investment education and asset allocation are becoming more significant.

As a firm, PwC currently provides consulting actuarial services to many types of large, complex entities including state and local governments and large private employers. Below we have listed some of our current public sector clients, including the approximate number of participants and number of years PwC has been retained.

Public employee retirement system	Type of services provided	Approximate number of participants	Number of years PwC has been retained
Indiana Public Retirement System	Actuarial valuation and consulting services – pension	308,000	4 years
PSRS and PEERS of Missouri	Actuarial valuation and consulting services – pension and OPEB	245,000	5 years
United States Coast Guard Military Retirement System	Actuarial valuation and consulting services – pension and OPEB	100,000	4 years
Shelby County Schools	Actuarial valuation and consulting services – OPEB	20,000	5 years
City of Memphis Retirement System	Actuarial valuation and consulting services – pension and OPEB	11,000	20+ years
City of Akron	Actuarial valuation and consulting services – OPEB	5,900	8 years
Metropolitan Water Reclamation District of Greater Chicago	Actuarial valuation and consulting services – OPEB	5,000	4 years
Administrative Office of United States Courts	Actuarial valuation and consulting services – pension	3,000	1 year
Columbus Regional Hospital	Actuarial valuation and consulting services – pension	2,000	20+ years

Our GHRS practice routinely assists these clients in evaluating and forecasting the financial condition of their plans, as well as providing a full range of other actuarial services to facilitate administration, financial reporting, and governance, including:

- Annual actuarial valuations and gain/loss analysis
- Review or replication of actuarial analysis performed by a prior actuary
- Periodic experience studies
- Fiscal analysis of proposed legislation affecting the benefit plans, including plan design changes
- Plan design consulting
- Fiscal analysis for newly covered employers and withdrawing employers
- Assistance in developing and maintaining actuarial tables for benefit administration
- Assistance in developing and maintaining user applications and actuarial calculation routines for member service purchases
- Maintaining modeling tools for providing projections of assets, liabilities, contribution rates, and cash flows to assist in budgeting and investment analysis
- Preparation of GASB 25/27 accounting information
- Modeling accounting requirements under GASB 67/68, including quantifying the impact to employer financial statements
- Assisting the Board and staff in developing a formal funding strategy and policy

- Asset/ Liability modeling
- General consulting regarding actuarial assumptions, methods, trends, and technical, policy and administrative issues
- Educational training for pension system Boards on a variety of topics
- Compliance reviews

As you can see, the actuarial analysis that we routinely provide to our public sector clients is consistent with the analysis that the Commission is seeking an actuary to review.

In terms of forecasting, PwC has significant experience and a number of modeling tools for forecasting assets, liabilities, contribution rates, and cash flows. We utilize our valuation system, ProVal, to perform one-off projections and to compute the sensitivities required for real-time "what if" scenario modeling. ProVal is described in more detail in the next section of our proposal.

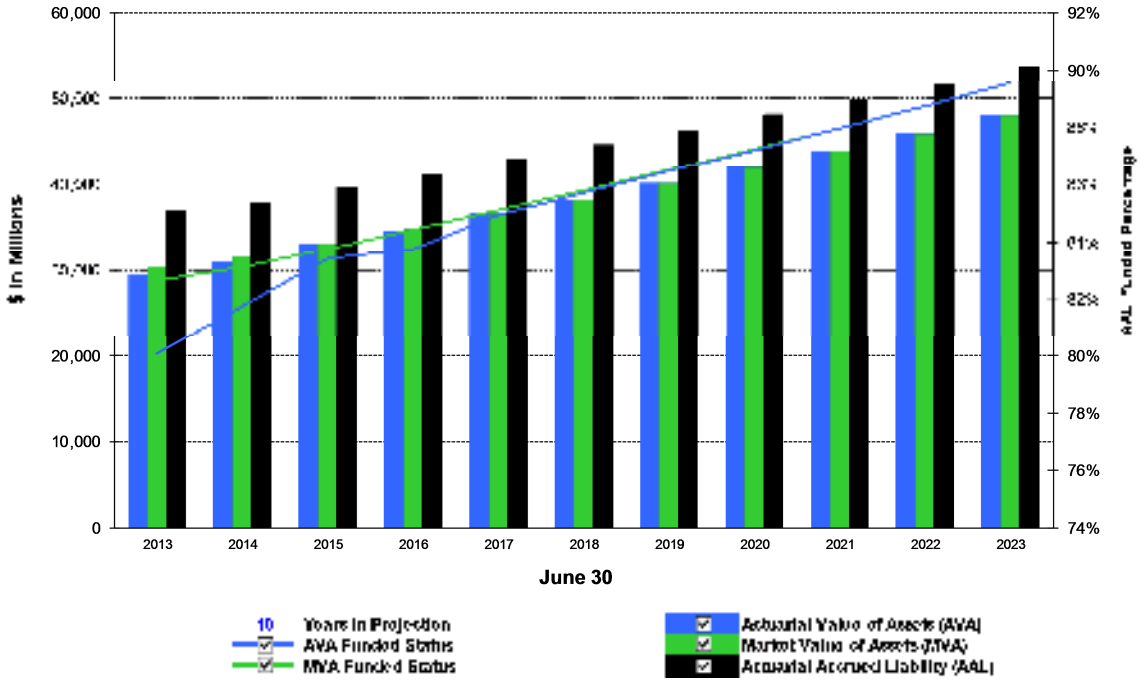
ProValPS is companion software to ProVal and is designed to run scenarios in a graphical and user-friendly manner. ProValPS utilizes output from ProVal and allows clients to run alternative projection scenarios for their plans on a real-time basis. ProValPS can be used for disclosure and budgeting, financial sensitivities, and asset allocation. ProValPS can be loaded onto your computers, which, in conjunction with baseline projections calculated and reviewed by PwC, can model sensitivity to asset return fluctuations, interest rate changes, and other variables. Alternatively, PwC can be the sole user of ProValPS and utilize its real-time capabilities during live meetings with the Commission.

PwC has also developed a Microsoft Excel-based forecasting tool for public sector clients. Given the wide range of actuarial cost methods, asset smoothing methods, and unfunded liability amortization methods utilized in the public sector, Excel often allows for easier customization to a particular client situation. Also, Excel is more universally recognized and used by our clients, and therefore generally does not require the download of additional third party software.

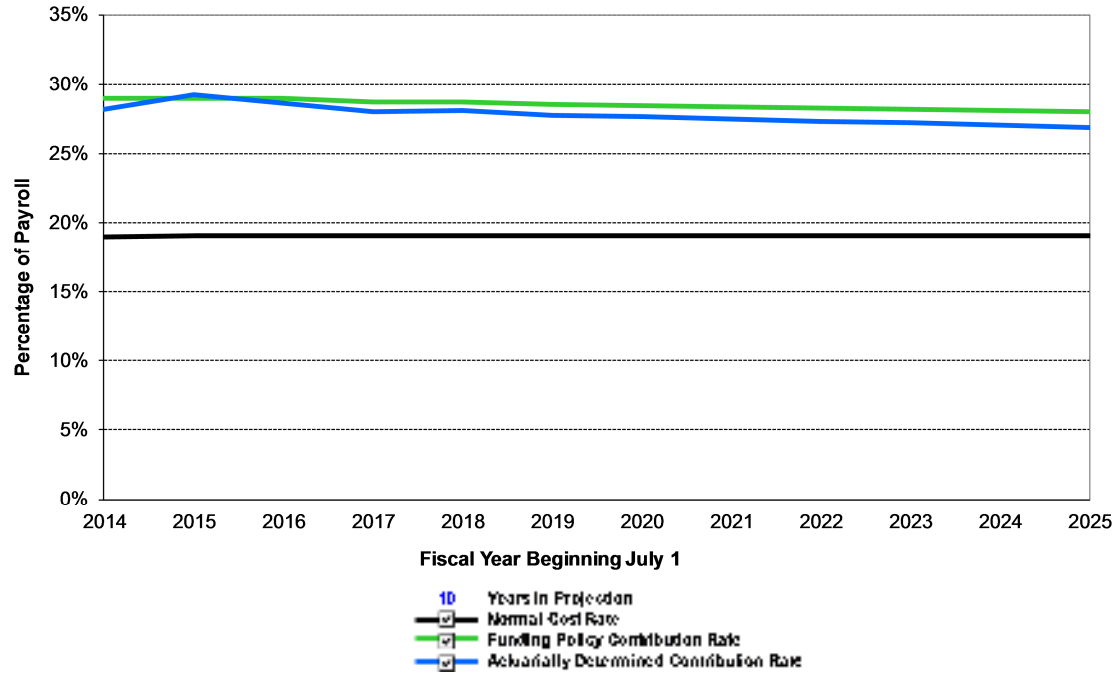
The standard version of the Excel-based projection tool is capable of modeling the impact of certain experience, such as investment experience, and assumption changes, such as a change in the interest rate used for discounting, input by the user. The modeling capability can also be enhanced to reflect specific client needs. For example, the tool could be customized to allow projections under various plan design alternatives.

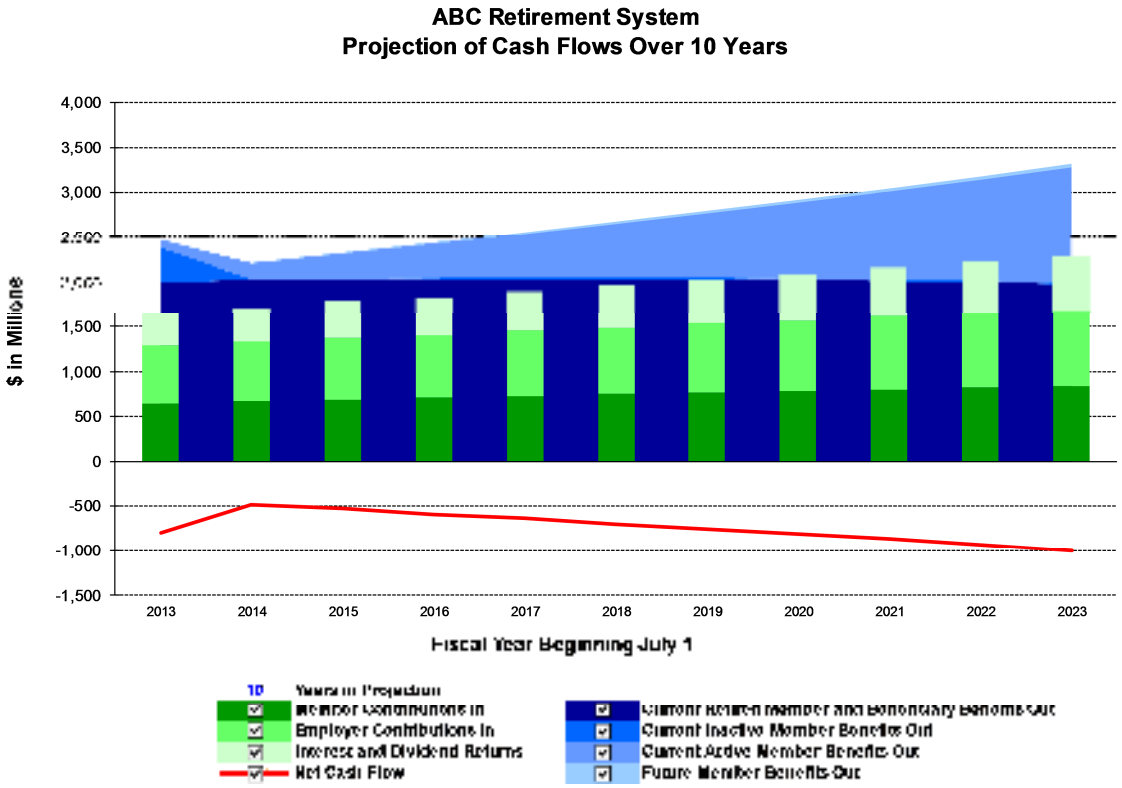
Graphical output, including the projected funded status, projected cost, and projection cash flows, is generated in real-time to facilitate scenario review, strategy development, and decision-making. Below are examples of the output form the model:

ABC Retirement System
Projection of Funded Status Over 10 Years



ABC Retirement System
Projection of Contribution Rates Over 10 Years





3) *Prior Public Pension Experience by Assigned Firm Personnel. Because continuity is very important in establishing sound public policy in the pension area, the prior public pension plan experience of the firm personnel primarily assigned to the Commission's work and the potential for a long-term relationship with the Commission and continuity is an important factor.*

We understand the desire for continuity in establishing sound public policy for pensions. The team we have assigned to this engagement has significant experience consulting with public retirement systems, including developing sound funding policy, investment policy, and administrative efficiency and accuracy. Cindy Fraterrigo and Brandon Robertson both serve on the engagement teams for the Indiana Public Retirement System and the Missouri Public School and Public Education Employee Retirement Systems, which are comparable in membership size and complexity to the plans identified in the RFP. They have been involved in delivering the various services identified above to those clients.

The remaining team members also have experience consulting with public sector pension systems and, perhaps equally important for this engagement, our entire team also has significant experience consulting with private sector clients and assisting with the audits of both public and private entities that sponsor defined benefit pension plans. A team that is seasoned in both consulting and auditing, in both the public and private sectors, allows us to deliver well-rounded review and insight to the Commission for years to come.

Below are brief biographies of each core team member, including their role for this engagement and experiences that will allow them to bring valuable insight to the Commission.

Cindy Fraterrigo, FSA, EA, MAAA – Principal

Adding value to the team:

Cindy will serve as the primary actuary. In this role, Cindy will work with Brandon Robertson, the secondary actuary, and the team in executing all projects in a timely manner, reviewing the work products to meet our high-quality standards, liaising with the Commission and Commssion staff, and attending meetings with the Commission as requested.

E-mail:	cindy.fraterrigo@us.pwc.com
Phone:	(312) 298-4320

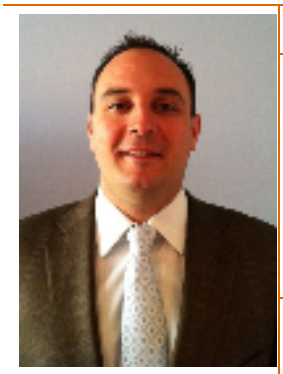
Cindy Fraterrigo is a Principal in the GHRS practice in the Chicago office of PwC. She has been with the firm since 1993. Cindy has 20 years of experience working with employers in the public and private sectors where she has played an integral role in developing creative solutions for their pension and postretirement medical and life plans from both an HR and financial perspective. Cindy has been involved with all aspects of retirement plans, including administration, funding, accounting, plan design, and compliance.

Cindy serves in a similar capacity on other public sector clients, including co-lead actuary for the Indiana Public Retirement System and Missouri PSRS and PEERS, and lead actuary for Columbus Regional Hospital. The Indiana Public Retirement System and Missouri PSRS and PEERS of Missouri are both comparable in size and complexity to the Minnesota plans identified in the RFP.

In addition to the traditional actuarial valuations, Cindy's experience with public government agencies has included valuations of budget proposals, plan design analysis, cost analysis for new entity joiners as well as withdrawals, performing experience studies and analyses of actuarial assumptions, analyzing the cost of proposed legislation, developing optional annuity form conversion tables, developing actuarial reserve factors, and preparing prior service credit purchase calculations. Cindy frequently speaks at actuarial organization meetings and spoke at a NASRA conference.

Cindy spent two years on secondment with PwC UK in London where she specialized in international accounting for employee benefit plans and share-based payment plans.

Cindy is a Fellow of the Society of Actuaries, an Enrolled Actuary, and a Member of the American Academy of Actuaries. She earned a BS in Actuarial Science from the University of Illinois in Urbana-Champaign, Illinois.



Brandon Robertson, ASA, EA, MAAA – Director

Adding value to the team:

Brandon will serve as the secondary actuary on the engagement. In this role, Brandon will work with Cindy and the team in executing all projects in a timely manner, work directly with Commisson staff on a day-to-day basis and be involved in all aspects of our actuarial consulting, including presenting to Commission and Commision staff.

E-mail:	brandon.j.robertson@us.pwc.com
Phone:	(312) 298-4143

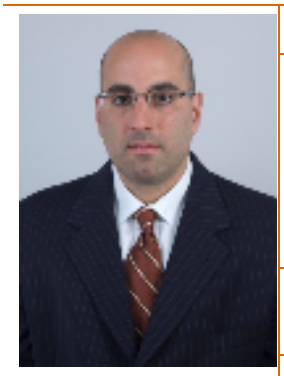
Brandon is a Director in the GHRS practice in the Chicago office of PwC. Brandon specializes in retirement benefits and has 14 years of experience in actuarial benefits consulting. He has a full range of retirement expertise.

Brandon serves as the co-lead actuary for the Indiana Public Retirement System and Missouri PSRS and PEERS. In addition to the traditional actuarial valuations, Brandon's experience with public government agencies has included plan design analysis, cost analysis for new entity joiners as well as withdrawals, assumption experience studies, developing custom tools for retirement system cost projection and administration, analyzing the cost of proposed legislation, developing optional annuity form conversion tables, developing actuarial reserve factors, preparing prior service credit purchase calculations, and presenting educational topics to retirement system Boards, such as GASB accounting and funding policy.

Brandon is active in the public sector market. He attends the annual NASRA conference, has co-authored an article on plan design for the public sector that was published in the NASRA weekly news, and is involved with various working groups on the implementation of GASB 67 and 68.

His knowledge of applicable accounting, reporting, and funding rules includes applicable pronouncements from the Governmental Accounting Standards Board, Financial Accounting Standard Board, International Accounting Standards Board, the National Association of Insurance Commissioners, and the Internal Revenue Service. Brandon has consulted with public and private clients and has served as the supervising actuary or secondary actuary in many cases.

Brandon is an Associate of the Society of Actuaries, an Enrolled Actuary, and a Member of the American Academy of Actuaries. He graduated summa cum laude from Michigan Technological University with a BS in Mathematics.



Jack Abraham, FSA, EA, MAAA – Principal

Adding value to the team:

As the leader of the Retirement portion of the GHRS practice nationally, Jack will ensure that our service team provides the highest level of service and quality to the Commission. He will also provide peer review assistance to the senior members of the engagement team as needed.

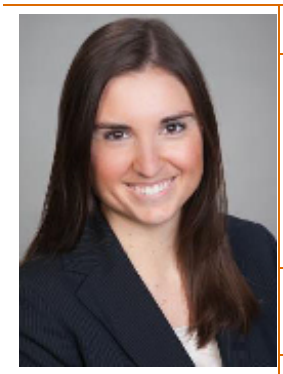
E-mail:	jack.abraham@us.pwc.com
Phone:	(312) 298-2164

Jack is a Principal in the GHRS practice in the Chicago office of PwC. Jack joined PwC in 1990 and has played an integral role in developing creative solutions to client issues from an HR and financial perspective. In addition, Jack has been involved with all aspects of retirement plans, including administration and application of the Employee Retirement Income Security Act and the Internal Revenue Code.

Jack is the national practice leader for the Retirement portion of our GHRS practice and plays an oversight role on all of the key clients to whom we provide actuarial valuation and consulting services.

Jack was the primary actuary assisting the PwC audit team in the audit of the Pension Benefit Guaranty Corporation for 12 years and was the supervising actuary on the International Monetary Fund valuation until 2004.

Jack is a Fellow of the Society of Actuaries, an Enrolled Actuary, and a Member of the American Academy of Actuaries. He earned a BA in Mathematics and Actuarial Science from the University of Illinois in Urbana-Champaign, Illinois.



Gina Uhrich, FSA, EA, MAAA – Manager

Adding value to the team:

Gina will serve as the project manager on the engagement. She will manage the actuarial staff in the completion of projects and coordinate with Cindy and Brandon for final review and delivery of PwC services to the Commission.

E-mail:	gina.uhrich@us.pwc.com
Phone:	(312) 298-3027

Gina is a Manager in the GHRS practice in the Chicago office of PwC. She is a credentialed pension actuary who has worked in the actuarial and employee benefits field for six years.

Gina serves in a manager role for many pension valuations for public and private clients. She has experience with defined benefit accounting under GASB, FASB, IASB, and NAIC, as well as the contribution and compliance requirements under IRC and ERISA.

Gina also has experience with projections, benefit administration, plan design projects, experience studies, and nondiscrimination testing. Gina provided actuarial support to the State Teachers Retirement System of Ohio when PwC was their actuarial provider.

Gina is a Fellow of the Society of Actuaries, an Enrolled Actuary, and a Member of the American Academy of Actuaries. She earned a BS in Mathematics from the University of Michigan in Ann Arbor, Michigan.

Kyle Sherlock, ASA, MAAA – Manager

Adding value to the team:

Kyle will serve as the back up project manager on the engagement. In the event Gina is unavailable, he will manage the actuarial staff in the completion of projects and coordinate with Cindy and Brandon for final review and deliver of PwC services to the Commission.

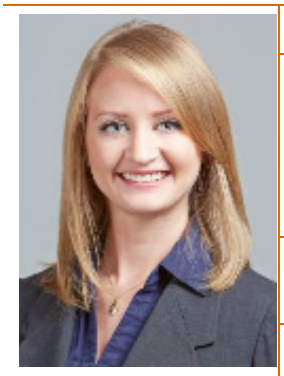
E-mail:	kyle.b.sherlock@us.pwc.com
Phone:	(312) 298-5262

Kyle is a Manager in the GHRS practice in the Chicago office of PwC. He specializes in employee benefits with a focus on retirement, and has 6 years of experience in actuarial benefits consulting.

Kyle serves in a manager role for many pension valuations for public and private clients, including serving as the primary project manager for the Indiana Public Retirement System and back up project manager for Missouri PSRS and PEERS. In addition to the traditional actuarial valuations, Kyle's experience with the public government agencies has included cost projects, plan design analysis, cost analysis for new entity joiners as well as withdrawals, experience studies, reviews and updates of actuarial factors, and developing custom retirement system tools for cost projections and plan administration.

He has experience with defined benefit accounting under Governmental Accounting Standards Board, Financial Accounting Standards Board and International Accounting Standards Board, as well as the contribution requirements under the Internal Revenue Code and Employee Retirement Income Security Act.

Kyle is an Associate of the Society of Actuaries, a Member of the American Academy of Actuaries, will shortly be obtaining his Enrolled Actuary designation. He is currently working toward his Fellowship designation. He earned a BS in Actuarial Science and Mathematics from the University of Iowa in Iowa City, Iowa.



Caroline Bowden – Senior Associate

Adding value to the team:

Caroline will serve as the lead actuarial staff on the engagement, working with Carolyn to prepare the initial work products, analysis, deliverables, and other materials and communications pertinent to our day-to-day services.

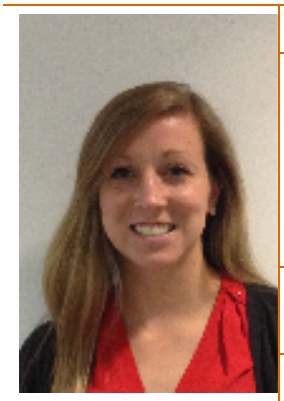
E-mail:	caroline.w.bowden@us.pwc.com
Phone:	(312) 298-3579

Caroline is a Senior Associate in the GHRS practice in the Chicago office of PwC. She specializes in pension actuarial valuations, analysis, and compliance. She has 5 years of experience working with government entities, corporations, and private partnerships on pension plan issues.

Caroline has experience with GASB accounting and public sector funding policies. Additionally, she has assisted with plan design, compliance, and communication with her clients' plans.

Caroline works on the Missouri PSRS and PEERS and Columbus Regional Hospital actuarial engagements.

Caroline is currently working toward her credentials with the Society of Actuaries and her Enrolled Actuary designation. She has a BS in Actuarial Mathematics from the University of Michigan.



Carolyn Steger – Associate

Adding value to the team:

Carolyn will serve as a staff team member for the engagement, working with the lead staff person and other associates preparing the initial work products, analysis, deliverables, and other materials and communications pertinent to day-to-day services PwC will provide.

E-mail:	carolyn.m.steger@us.pwc.com
Phone:	(312) 298-4867

Carolyn is an Associate with our GHRS practice, based in Chicago. She specializes in actuarial valuation work and has experience in working with governmental entities, corporations and private partnerships on pension plan issues.

Carolyn currently serves as a staff member for the Indiana Public Retirement System. She has working knowledge of GASB accounting and funding standards from her experience in working with the governmental pension plans for this client.

Carolyn is currently working toward her credentials with the Society of Actuaries. She has a BS in Actuarial Science and Psychology from Eastern Michigan University in Ypsilanti, Michigan.

4) *Prior Reviewing/Auditing Actuary Experience. The prior experience of the actuarial firm and of the actuarial firm personnel proposed for assignment to Commission work in reviewing or auditing the work product of other actuaries is an important factor.*

As part of the largest accounting firm in the world, our actuaries provide specialist audit support assistance to our audit teams on hundreds of engagements. This support ranges from reviewing the assumptions and methods proposed by clients, reconciling the accounting results, to independently verifying the benefit obligations based on the Plan's benefit formulas, assumptions, methods, and census data.

In addition to our audit support, PwC has been retained by a number of clients to review the work of other actuarial consultants for many different purposes. For these projects, PwC and the Plan actuary work in collaboration. As a result of many of these projects, we independently review the work of the Plan actuary including reviewing the reasonableness of the assumptions and methods and the magnitude of the liabilities. The following is a summary of our consulting services where a by product of the services is a detailed review of the work of another actuary:

- **Asset Liability Management Analysis** - In performing asset liability studies, it is imperative that we understand the underlying benefit obligations and expected cashflows of a Plan. For each asset liability project that we complete, we first replicate the liabilities determined by the Plan's actuary. In addition, the asset liability management analysis independently determines the annual required contributions and pension expense results.

- **Expert Witness/Litigation Support** - On a number of occasions, PwC has served as an expert witness and provided litigation support on actuarial matters. For these projects, PwC independently confirmed the work of another actuary. For a few cases, the litigation support included determining the potential loss impact to the entity due to the actuary's valuation error.

- **Plan design** - In performing plan design projects for our public pension plan clients, we have reproduced the valuation results performed by the Plan's actuary. We perform the valuation replication so that we are able to determine the financial impact of plan changes, work which is similar to the the review or audit of actuarial cost estimates of proposed legislation.

PwC has also performed actuarial valuation replications of the following public sector plans:

- The Indiana Public Retirement System, including separate replications for plans benefiting public employees, police and fire, gaming agent and conservation officers, judges, legislators, and prosecuting attorneys.
- Missouri Public School and Public Education Retirement Systems
- State Teachers Retirement System of Ohio
- Virginia Retirement Systems

PwC also audited the financial statement of the Pension Benefit Guaranty Corporation (PBGC) for 12 years. The audit services included reviewing determinations of benefit liabilities and reviewing the actuarial projections of the liabilities and assets for plans under PBGC control.

5) *Accessibility. The availability of the firm personnel assigned to the Commission work to meet with the Commission, often on short notice during the legislative session between January and May, annually, is an important factor.*

The team assigned to this engagement understands the importance of accessibity and responsiveness. While our team is located in Chicago, we are committed to meeting your needs and can easily be in Minneapolis on short notice. The proximity of both our Minneapolis and Chicago offices to your offices, combined with the fact that our technology infrastructure allows our consultants to meet with clients via video conference over the internet and access internal information and work papers from anywhere in the world, will allow our consulting team to meet with you in person as frequently as is necessary and at minimal expense.

Specifically, Cindy Fraterrigo, Brandon Robertson and other core team members as needed, will be accessible to the Commission during the legislative session between January and May.

6) *Absence of Contractual Liability Limits and Contractual Third-Party Reliance Disclaimers. The extent to which the consulting actuarial firm seeks to limit its liability with respect to errors in its actuarial work or to disallow reliance on actuarial results by third parties is an important factor.*

This proposal in response to the Minnesota Legislative Commission on Pensions and Retirement ("Commission") Request for Proposal for Provision of Consulting Actuarial Services ("RFP") does not constitute a contract to perform services and cannot be used to award a unilateral agreement. Final acceptance of this engagement by PwC is contingent upon successful completion of PwC's acceptance procedures and is subject to the parties reaching agreement on a mutually satisfactory engagement contract. The parties will negotiate the terms of the final contract, including modifications to certain RFP terms and conditions. Since we currently have a Master Services Agreement in place with the State of Minnesota, we propose to use the existing MSA as the basis for the negotiation of these contract terms. PwC reserves the right to review any representations and certifications provided to the Commission and resubmit or update such information, as appropriate, after award.

PwC looks forward to negotiating a contract that fits the services we propose to perform. Given our past history of successfully negotiating mutually agreeable terms with the State of Minnesota, we do not anticipate any difficulty in reaching a contractual agreement that will enable us to provide the professional services which you are requesting, while protecting the interests of both parties.

Firm Information

Firm Information

In addition to indicating how the actuarial firm meets the minimum conditions described in section IV of the RFP, the Commssion requires the actuarial firm to demonstrate its qualifications through a narrative presentation of the following information:

1) Firm's Structure, Operational Method, and Communication Capability. Describe the structure of the actuarial firm and its operational method. Include in the description an indication of how the actuarial firm communicates pension fundamentals in an understandable manner to audiences of diverse and non-technical backgrounds.

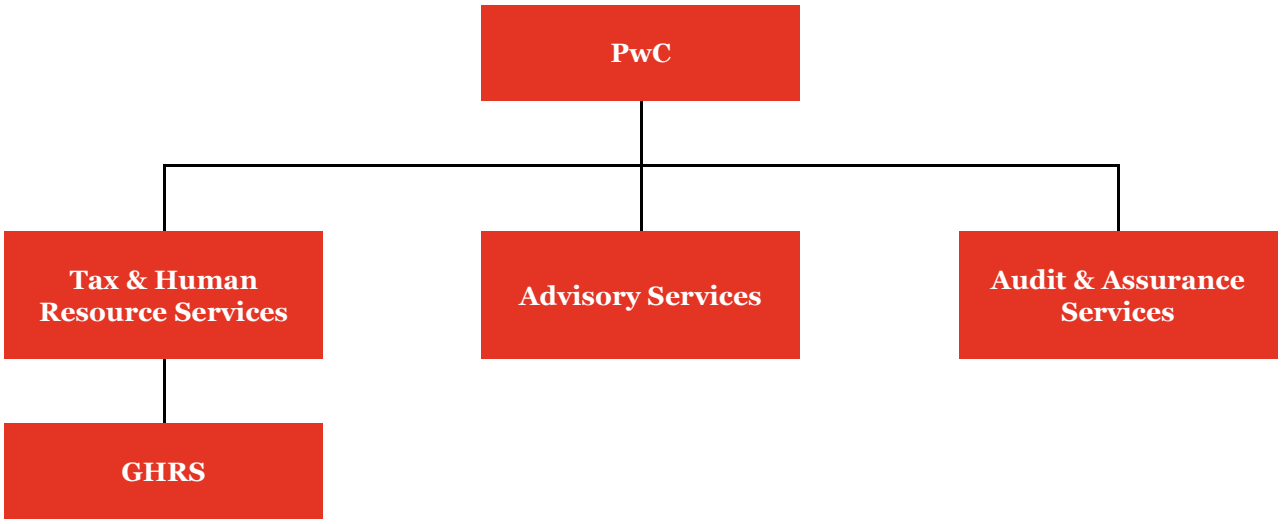
PwC is organized around three core lines of service:

- **Human Resources Services and Tax** — a wide range of innovative human resource services and tax in three main areas: human resources (including actuarial and consulting services), tax structuring , and compliance

  Our GHRS practice provides a full range of actuarial and other retirement services, including the following:

Total retirement plan design, including qualified and nonqualified plans, defined benefit, defined contribution, and hybrid retirement arrangements	Post-retirement medical and life plan design and valuations, including defined benefit and defined contribution arrangements
Defined benefit retirement plan actuarial valuations and projections	Financial reporting support
Estimates of future plan accounting and funding requirements	Collective bargaining assistance
Estimates of cost of plan improvements and legislative initiatives	Actuarial experience studies
Participant total retirement plan risk exposure analysis	Asset/liability modeling
Pension asset allocation strategies and support	Investment policy statements
Governance support and education	Plan (fund) performance measures
Development of plan/benefit related communications	Benchmarking

- **Advisory Services —** comprehensive advice and assistance related to transactions, performance improvement and crisis management based on long-term quality relationships with clients and our financial, analytical and business process skills
- **Audit and Assurance Services —** innovative, high-quality, and cost-effective services related to organizations' financial control, regulatory reporting, shareholder value, and technology needs



Overlaying these lines of service are several "industry practices." We have organized ourselves to deliver our industry expertise to 21 industry sectors, including the government/public services and health care sectors.

To meet the Commission's needs, PwC will draw upon the capabilities of our Global Human Resource Services Practice ("GHRS"). As a trusted provider of actuarial and benefits consulting services, we understand how best to leverage our resources to meet today's retirement program challenges. With PwC as a service provider, the Commission will be working with more than just actuaries.

Our benefit professionals are well versed in the various business issues facing today's governments, and they know how to translate complex, numerical results into understandable, concise, and actionable ideas for improvement. Our team recognizes that our clients and audiences are typically not actuaries and that we need to take a step back and make sure that we present terminology and concepts in a way that is understandable and relatable to the lay person. We have developed a short "Actuarial 101" presentation that is often a useful opener to technical subject matter, such as actuarial valuation results. We are also able to draw parallels between actuarial concepts and real-world situations that are familiar to our audience.

Cindy, Brandon, and the other members of our core engagement team have had substantial exposure to client interactions, public and conference speaking opportunities. They have taught various topics in the areas of benefits, pensions, and HR Effectiveness. Cindy and Brandon have been recognized by their peers and by their clients as being effective at converting complex topics, such as actuarial valuation results, into terms which can be understood by lay persons. They present concepts in a way that is clear, focused, and actionable.

To illustrate examples of our written communication, we have included a sample actuarial report, sample experience study report, and a sample benefit cost estimate report in Appendices A, B and C, respectively.

A final aspect of our communication philosophy is the need for continuous feedback from our clients. We set expectations at the start of a project, encourage our clients to monitor our progress while the project is in process, and seek feedback at the end of the project. This process applies to major projects such as the annual valuations, as well as smaller studies and requests.

2) *Firm's Prior Public Pension Experience. Provide a description of any major public employee pension plan actuarial valuation and related experience by the actuarial firm rendered during the last five years and the degree of any consulting or other involvement by the actuarial firm with other elected public bodies.*

PwC currently provides actuarial valuation services to the following public employee plans:

Public employee retirement system	Type of services provided	Approximate number of participants	Number of years PwC has been retained
Indiana Public Retirement System	Actuarial valuation and consulting services – pension	308,000	4 years
PSRS and PEERS of Missouri	Actuarial valuation and consulting services – pension and OPEB	245,000	5 years
United States Coast Guard Military Retirement System	Actuarial valuation and consulting services – pension and OPEB	100,000	4 years
Shelby County Schools	Actuarial valuation and consulting services – OPEB	20,000	5 years
City of Memphis Retirement System	Actuarial valuation and consulting services – pension and OPEB	11,000	20+ years
City of Akron	Actuarial valuation and consulting services – OPEB	5,900	8 years
Metropolitan Water Reclamation District of Greater Chicago	Actuarial valuation and consulting services – OPEB	5,000	4 years
Administrative Office of United States Courts	Actuarial valuation and consulting services – pension	3,000	1 year
Columbus Regional Hospital	Actuarial valuation and consulting services – pension	2,000	20+ years

In addition to performing actuarial valuation, we routinely assists these clients in evaluating and forecasting the financial condition of their plans, as well as providing a full range of other actuarial services to facilitate administration, financial reporting, and governance, including:

- Review or replication of actuarial analysis performed by a prior actuary
- Periodic experience studies
- Fiscal analysis of proposed legislation affecting the benefit plans, including plan design changes
- Plan design consulting
- Fiscal analysis for newly covered employers and withdrawing employers
- Assistance in developing and maintaining actuarial tables for benefit administration
- Assistance in developing and maintaining user applications and actuarial calculation routines for member service purchases
- Maintaining modeling tools for providing projections of assets, liabilities, contribution rates, and cash flows to assist in budgeting and investment analysis
- Preparation of GASB 25/27 accounting information
- Modeling accounting requirements under GASB 67/68, including quantifying the impact to employer financial statements
- Assisting the Board and staff in developing a formal funding strategy and policy
- Asset/ Liability modeling
- General consulting regarding actuarial assumptions, methods, trends, and technical, policy and administrative issues
- Educational training for pension system Boards on a variety of topics
- Compliance reviews

Through the delivery of actuarial consulting services to these entities, PwC practitioners have occasionally been asked to present or explain actuarial concepts and calculations to certain elected officials. For example, as part of the actuarial services provided to the Indiana Public Retirement System and to Missouri PSRS and PEERS, Cindy and Brandon have been asked to present the fiscal impact of proposed legislative changes to personnel from each State's Legislature.

3) Function of Assigned Firm Personnel and Prior Experience. For each non-clerical employee of the actuarial firm proposed to be assigned to Commission work, identify the Minnesota public employee pension plans or functions with which the person will be involved and indicate the person's prior public employee pension plan experience.

We anticipate than all team members will be involved in projects relating to each Minnesota public employee pension plan identified in the scope of this engagement. Each team member possessing comprehensive knowledge of the plans in question will allow us to provide uninterrupted service to the Commission in the absence a team member.

Please refer to item 3 in the previous section titled, "Minimum Qualification Standards and Important Qualification Factors", for brief biographies of each non-clerical team member assigned to this engagement. The biographies describe each member's relevant prior public employee pension plan experience.

4) <u>References.</u> List five major retirement systems or businesses with defined benefit pension plans by which the actuarial firm previously has been retained, complete with the name and telephone number of a contact person, as references who can be contacted about the prior performance of the actuarial firm in providing actuarial services.

Indiana Public Retirement System	Donna Brown Chief Financial Officer 1 North Capitol Indianapolis, IN 46204 (317) 234-2383 DoBrown1@inprs.in.gov
Missouri PSRS and PEERS	M. Steve Yoakum Executive Director 3210 West Truman Boulevard Jefferson City, MO 65109 (573) 638-1099 syoakum@psrsmo.org
United States Coast Guard Military Retirement System	David Casteel Chief Warrant Officer 2100 2nd Street SW Washington, DC 20593 (202) 372-3472 david.p.casteel@uscg.mil
City of Memphis	Brian Collins Finance Director 125 N. Main St. Memphis, TN 38103 (901) 636-6657 Finance@memphistn.gov
State Teachers Retirement System of Ohio	Michael Nehf Executive Director 275 East Broad Street Columbus, OH 43215 (614) 227-4001 nehfm@strsoh.org

5) *Client Additions and Subtractions. Provide a list of all new clients added by the actuarial firm and all former clients lost by the actuarial firm during the most recent five-year period.*

Client confidentiality is a serious matter at PwC and we do not release the names of our current or former clients without prior authorization to do so and with the client's understanding of the purpose for releasing their name and the recipient of the information. Given the number of new and former clients that have engaged PwC in the last five years, it is not feasible to obtain the proper consent from all clients in order to provide the list requested.

Please refer to our list of references above, which does include a client who retained PwC within the past five years (e.g. Indiana Public Retirement System) and a former client (the State Teachers Retirement System of Ohio) should the Commission be interested in contacting our clients to verify our engagement and performance.

6) *Firm's Valuation System. Describe the valuation system of the actuarial firm, indicate whether the software proposed to be used has been obtained from an outside vendor or is proprietary software developed by the actuarial firm, and indicate the capabilities and procedures of the actuarial firm to retain prior actuarial valuation and related data.*

PwC's actuarial valuation system is ProVal, which was developed by a third-party vendor, WinTech. We implemented ProVal in early 2001 and currently use it to perform all defined benefit pension and post-retirement medical actuarial valuations and projections.

PwC's innovative perspective and early entry to forecasting and projection was a main reason that we were one of the first major firms to move to ProVal, and many other firms have followed suit. ProVal is specifically designed to run multiple scenarios and generates standardized output. The same system is also used for preparing projections of liabilities, assets, contribution requirement, and accounting requirements based on assumptions of future plan experience. In addition to calculating system liabilities based on specific actuarial cost methods, ProVal can also compute smoothed asset values.

ProVal is a Windows-compliant application that resides on each user's personal computer. All processing of valuation data and actuarial computations occurs locally on each user's personal computer. All client projects, results, and report files are archived on Windows-based network servers local to each office. We perform daily and monthly backups through the firm's network. Data backups are retained for one year onsite and stored offsite for six years.

ProVal has extensive projection capabilities and is continually maintained and updated for legislative, methodological and technical changes. ProVal is maintained by WinTech, which leads a user group to decide on all upgrades. PwC is a member of this user group, and has been the driving force behind a number of upgrades to the valuation and projection capabilites.

7) Firm's Potential Conflicts of Interest. If the actuarial firm previously has been retained by a statewide or local Minnesota public pension plan, a Minnesota governmental employing unit, a Minnesota public employee labor union, or a comparable party interested in Minnesota public pension policy development, those relationships should be indicated. If the actuarial firm intends to continue any of these prior relationships during the course of a contract with the Commission, address the extent that the relationship constitutes a potential conflict of interest when providing services for the Commission and how the actuarial firm will deal with any actual conflicts.

Given its size and numerous employees, principals and partners, PwC is incapable of providing the information requested. As such, PwC requests that the information provided in response to this request be limited to the knowledge and belief of the PwC Principal responsible for the performance of this Agreement.

To the knowledge and belief of Cindy Fraterrigo, the PwC Principal responsible for the performance of this Agreement, the following are the current or previous relationships between PwC and statewide or local Minnesota public pension plans, Minnesota governmental employing units, or comparable parties interested in Minnesota public pension policy development:

Project description	Details of services provided
State of Minnesota - MNsure Identity Management Support	PwC has been engaged in implementing and supporting the Identity and Access Management (IAM) environment since late 2012 for MNsure.
State of Minnesota - Department of Human Services Modernization	PwC is currently involved in planning the go-forward architecture and solutions to update and consolidate existing IAM deployments supporting legacy applications such as MN.ITS, SMI, CSED, and Continuing Care that are managed by DHS.
State of Minnesota - MNLARS	PwC is providing IAM installation and upgrade services for the multiple environments supporting the overall MNLARS environment. PwC is also engaged in providing a high-level review of the IAM functional area for MNLARS. The focus of the assessment is on the System Development Life Cycle (SDLC) and the technical aspects of the system.

To Cindy's knowledge, none of these relationships represent a conflict of interest related to the services being requested by the Commission. As such, these current relationships and engagements are expected to continue should we be contracted by the Commission to provide consulting actuarial services.

8) *Most Recent Audited Annual Financial Report. If the actuarial firm is publicly held, provide a copy of the firm's most recent audited annual financial report.*

As a private partnership, the financial statements of PwC are not audited and are not a matter of public record. However, to assist you in evaluating our financial strength, please consider the information below.

Condensed Financial Information:

As of, or for the year ended, June 30 ($ in millions)	2013	2012	2011	2010	2009
Total assets	$6,084	$6,066	$5,586	$5,116	$4,734
Partners' equity	$1,736	$1,755	$1,718	$1,569	$1,793
Current ratio	1.44	1.48	1.54	1.52	1.44
Debt-to-capitalization ratio	0.25	0.27	0.27	0.26	0.15
Total revenues	$11,041	$10,157	$8,821	$8,044	$8,207
Growth rate	8.7%	15.1%	9.7%	-2.0%	-3.0%

Credit Rating/Credit Facilities:
PwC LLP does not have a Moody's or S&P credit rating as it does not issue debt in the public markets. However, the National Association of Insurance Commissioners (NAIC) provides credit ratings based on private placement debt. PwC LLP's NAIC credit rating as of June 2013 was one, with one being the highest rating and six being the lowest. A NAIC rating of one is assigned to obligations exhibiting the highest quality and when credit risk is at its lowest and the issuer's credit profile is stable. This means that interest, principal or both will be paid in accordance with the contractual agreement and that repayment of principal is well protected. In addition to long term debt reflected on the balance sheet, the firm has unsecured revolving lines of credit with a syndicate of major banks. No amounts were outstanding as of June 30, 2013.

Z-score:
The Z-score is a formula involving multiple variables that measures the financial health of a company and may be used to predict the probability that a firm will go bankrupt within two years. Z-scores are also used to predict corporate defaults and as a control measure for the financial distress status of companies. A private non-manufacturing company is considered healthy if its score is 2.6 or higher.

Year ended June 30,	2013	2012	2011	2010	2009
PwC LLP Z-score	5.52	5.36	5.56	5.54	5.93

Dun and Bradstreet (D&B) Supplier Risk Score:
D&B provides Supplier Qualifier/Evaluation Reports to help companies evaluate suppliers and potential suppliers according to risk, financial stability and business performance. The supplier risk score is meant to predict the likelihood of a firm ceasing business without paying all creditors in full, or reorganizing or obtaining relief from creditors under state/federal law over the next 12 months. The score is based on trade references, payment timeliness, outstanding litigation, financial statements, national debt rating and D&B rating as well as other indicators. PwC LLP's D&B supplier risk score as of June 2013 was four with one being the lowest risk and nine being the highest. As the firm does not disclose its financial statements publicly, and does not have a national debt rating, which are two key components of the overall score, the score is heavily dependent on payment timeliness, outstanding litigation and other indicators which are unpredictable and can cause the score to be extremely volatile. The firm's D&B number is 00-186-3794.

As of June	2013	2012	2011	2010	2009
PwC LLP D&B supplier risk score	4	4	4	4	4

Approach and Work Plan

Approach and Work Plan

The actuarial firm must specify how it will provide the required and requested actuarial services within the specified timeframes and must indicate how its staff and the various projects will be organized to carry out the required tasks.

Further, the work plan must identify the person who will be assigned overall responsibility for the work and indicate the business office location of that person.

The actuarial firm must set forth its implementation procedures, which must specify:

1) How the work of the firm under the contract will be coordinated with the Commission staff.

Actuarial Review and Replication
We understand that each year of the engagement will require us to perform a review of the actuarial valuations for eleven of the plans identified in the RFP and a replication of the actuarial valuation for one plan identified in the RFP. The following outline highlights the major steps we will follow to coordinate with the Commission in completing this work.

Step 1: Planning Meeting with Commission Staff — Frequent discussions and face-to-face meetings with the Commission staff is a central theme of our consulting philosophy. It is particularly vital that a planning meeting occurs each year prior to our beginning work on the annual pension review. Cindy, Brandon, and Gina will attend the valuation review planning meeting, which we anticipate will occur in November each year, concurrent to the release of the actuarial valuation reports. For the first year of the engagement, we will have a planning meeting at the commencement of the contract.

The agenda of the valuation review kick off meeting will include the following items:

- Review of the prior year's work to identify the strengths and weaknesses of the process and look for areas for improvement
- Legislative changes at either the state or federal level that need to be considered in the coming valuation
- Preliminary project plan that reviews responsibilities for tasks and includes internal intermediate deadlines and deadlines for deliverables
- Concerns raised by the Commission at recent meetings
- Issues currently under discussion in the State Legislature, including any bills that are likely to require an actuarial analysis in the near future
- Recently adopted or proposed federal legislation and guidance that could potentially impact the Commission
- Administrative support issues

To help us minimize our travel expenses and ensure efficient service to the Commission, our consultants will be able work out of our Minneapolis office on the days of the meetings.

Step 2: Membership Data Analysis and Summarization – For the plan where we complete a full replication of the actuarial valuation, we will analyze the data used by the actuary in his/her calculations. Reviewing and analyzing the membership data is a key step in an annual pension valuation. Our data analysis process consists of the following major phases:

- **Data Completeness** — Our data completeness analysis begins by verifying that the file width matches the data specifications, and all of the fields appear to be populated. In addition, we check that the number of records in the file is reasonable relative to the prior year's data and agrees to the actuary's report. We then proceed to check to make certain that there are no records missing vital data elements. For example, all records should have dates of birth, all active records should have salary information, and all retired records should have benefit amounts.

- **Data Reasonableness and Consistency** — Once we have reviewed the data for completeness, we then check to make certain that the data is reasonable, consistent internally, and consistent with the prior year's data. Examples of issues for which we check in this step are active members hired at unusual ages, active members with unreasonable salaries, and retired members whose benefit amounts changed significantly from the prior year.

- **Data Reconciliation** — The next step in the data process is to review the actuary's detailed reconciliation of the prior year's data to the current year's data. We will review the flow-of-lives illustration in the actuary's report that summarizes all of the movement from the members included in the prior year's valuation to the members included in the current year's valuation. From this exhibit, we can easily see information such as how many active members retired in the past year, how many retired members died, and how many members are new to the data this year.

- **Data Questions** — When working with large member databases, it is likely that the preceding three steps will uncover issues. After compiling these issues, we then forward them to the Commission and /or the plan administrator. Once we receive responses to these questions, we will incorporate any findings into our report.

For the plans where we perform only a review of the valuation, we will perform a high level review of the member data by completing the first three steps above.

Step 3: Review Actuarial Calculations and Gain/Loss Analysis — Once we have finalized the data review necessary for the actuarial valuation, we then will perform a review of any actuarial calculations. For example, for the annual pension valuation, the primary calculations that we will review are the determination of the liabilities, normal cost rate, and amortization components. In order to confirm that the actuary's calculated obligation is reasonable, we will review the following:

- **Review Plan Provisions** — Every actuarial calculation begins with a review of the relevant plan provisions. In the case of an annual valuation, the provisions from the prior year are reviewed and updated for any changes that occurred since the prior valuation. If there were changes in the plan provisions, the valuation will include an analysis of the impact of the changes.

- **Review Assumptions** — In addition to reviewing the plan provisions, we also review the actuarial assumptions prior to each project. This step is especially important whenever there has been a change in plan provisions since the last valuation, or when a change in plan provisions is under consideration. For example, changes in the early retirement provisions could cause members to accelerate or delay their retirements, which may impact retirement rates.

- **Review and Update Programming** — Before performing any actuarial calculations, we thoroughly review the liability coding that we will use to perform the valuation. If any changes have occurred since the prior valuation, we incorporate them at this time. A major part of this process includes checking our programming by reviewing the liabilities generated for individual sample lives.

- **Generate Liabilities and Contribution Rates** — Once we are comfortable that the liability calculations are correct for the sample group, we perform the calculations for the entire member population. We then summarize these calculations using standardized spreadsheets and work papers. These spreadsheets will replicate the calculations of the funded ratio, unfunded liabilities, required contribution rates, etc.

- **Analyze Differences between PwC expected results and actual results prepared by the actuary** — The final step in the actuarial review/audit process is the analysis of the differences that were identified in reviewing the actuary's valuation and reports. All actuarial calculations involve assumptions about future events and actuarial techniques are applied to measure the benefit obligation utilizing the selected assumptions. Our goal is to confirm the actuary appropriately applied the actuarial assumptions and plan rules in the valuation of the obligation and to confirm the actuary applied the required methods selected by the Commission.

For the plans where we perform only a review of the valuation, we will complete only the first, second and fifth steps shown above. For the fifth step, we will use the actuary's calculation of the liabilities and then confirm that our calculations of the funded status, contribution rates, etc. agree to the actuary's.

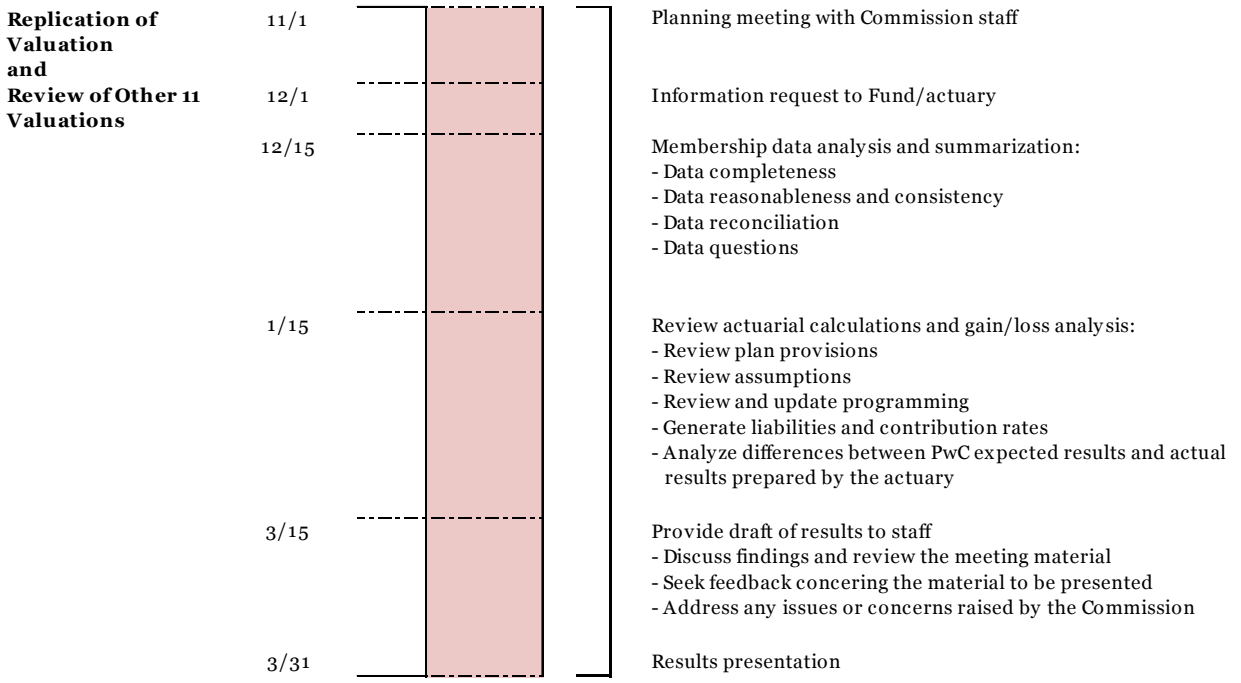
Step 4: Results Presentation—Presenting our results to the Commission is the final step in the review and replication procedures. This step will consist of several phases:

- **Draft of Results to Staff**—We will discuss our findings and review the meeting material with the Commission staff in advance of the meeting. During this review, we will highlight the key issues in the valuation results, seek feedback from the staff concerning the material that we will present, and address any issues or concerns raised by the Commission staff.

- **Final Results to the Commission**—After PwC and the Commission staff have reviewed the valuation results and drafts of the meeting material, we will deliver the final material to the Commission in advance of the meeting.

- **Present Results to Board**—The primary goal of our presentation will be to explain the valuation process, assumptions, methodology, and results in laymen's terms. Cindy Fraterrigo and Brandon Robertson will be the primary presenters to the Commission.

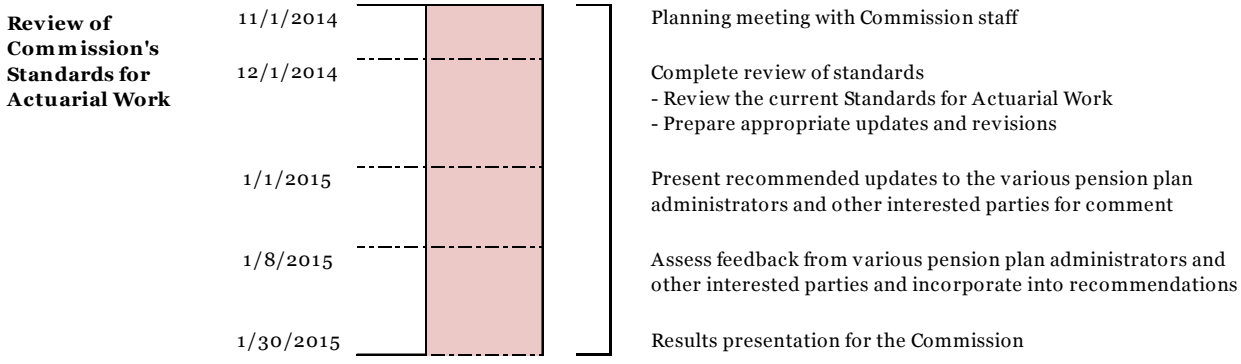
The following timeline presents our anticipated timing for completing the annual review and replication procedures:



Review of Commission's Standards for Actuarial Work

We understand that during the first year of the engagement we will also be required to review the Standards for Actuarial Work adopted by the Legislative Commission as of June 30, 1985, and amended periodically thereafter. As part of the review process, we will recommend updates to the standards, first for comment by the various pension plan admnistrators and other interested parties, and then for consideration by the Commission.

The following timeline presents our anticipated timing for coordinating with the Commission and plan administrators in completing the review of the Standards for actuarial Work:



Review of Quadrennial Experience Studies for Three Largest Pension Plans
We understand that during 2015 we will also be required to review the quadrennial experience studies for the three largest plans (MSRS General, PERA General, and TRA) and that review of the experience studies must be completed within 60 days of the release of the final experience study report. The following outline highlights the major steps we will follow to coordinate with the Commission in completing this work.

Step 1: Planning Meeting with Commission Staff — Prior to beginning our review of the experience studies, it is important that we also discuss the review of the past quadrennial experience studies for the three largest plans.

The agenda of the experience studies review kick off meeting will include the following items:

- Review of the prior studies' work to identify the strengths and weaknesses of the processes and look for areas for improvement
- Legislative changes at either the state or federal level that need to be considered in the development of the assumptions
- Preliminary project plan that reviews responsibilities for tasks and includes internal intermediate deadlines and deadlines for deliverables
- Concerns raised by the Commission
- Issues currently under discussion in the State Legislature, including any bills that are likely to alter the plan design and thus the members' decisions

Step 2: Review of Issued Experience Studies — Once we have received the experience study reports, we will assess the reasonability in comparison to the prior actuarial reports issued, review the analysis of the experience studies and the associated impacts, and develop considerations based on the review. This step will include the following processes:

- **Compare Data Statistics to Recent Actuarial Reports** — Given that the Commission's experience studies are based on five years of Fund-specific data, our first step will be to assess the reasonability of the data used by comparing the year-over-year member counts and statuses in the experience study to that of the actuarial reports issued over the five-year period for which the experience study covers. This first step is important to verify that there is consistency between the actuarial valuations and the experience study along with providing a level of comfortability that underlying data upon which the analysis is performed is reasonable.

- **Review Analysis of Each Experience Study** —We will assess the analysis of each assumption for each Fund to independently determine whether or not a change is warranted and to opine on the reasonability of the recommendations.

- **Review Impact of Recommendations** — Using the recommendations, we will assess the reasonability of the impact associated with each assumption change as well as provide any impacts related to alternative considerations we may offer to the Commission.

- **Develop Considerations for the Commission** — Along with providing a sense of comfort to the Commission regarding the reasonability of the recommendations pursuant to each Funds' experience study, we will also provide additional items for the Commission to consider prior to implementing the proposed changes of the experience study.

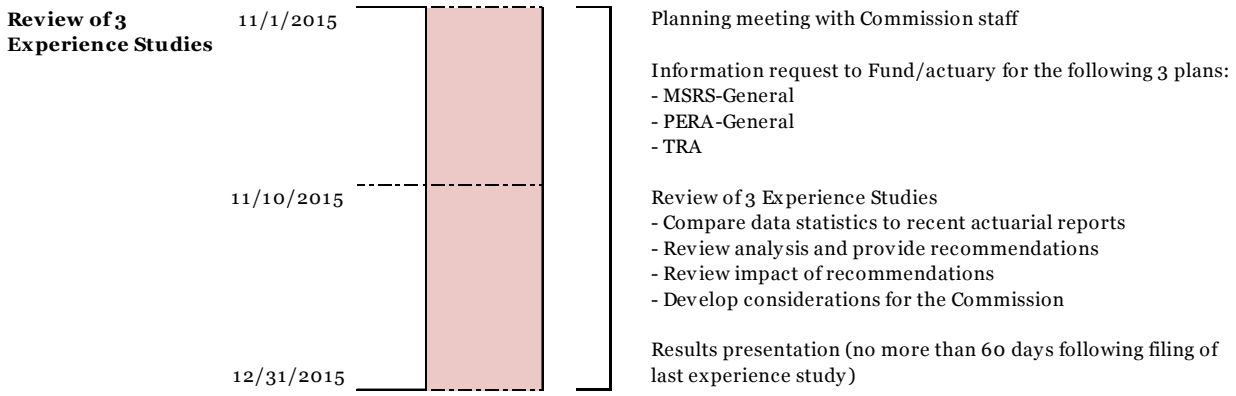
Step 3: Results Presentation—Presenting our results to the Commission is the final step in the review and replication procedures. As indicated by the Commission, this will be no later than 60 days after issuance of the final experience study expected to be reviewed. This step will consist of several phases:

- **Draft of Results to Staff**—We will discuss our findings and review the meeting material with the Commission staff in advance of the meeting. During this review, we will highlight the key issues in each of the experience studies, seek feedback from the staff concerning the material that we will present, and address any issues or concerns raised by the Commission staff.

- **Final Results to the Commission**—After PwC and the Commission staff have reviewed the experience studies review meeting material, we will deliver the final material to the Commission in advance of the meeting.

- **Present Results to Board**—The primary goal of our presentation will be to explain the experience studies and results in laymen's terms. Cindy Fraterrigo and Brandon Robertson will be the primary presenters to the Commission.

The following timeline presents our anticipated timing for completing the review of the experience studies, and assumes the final study report is released at the end of August 2015:



2) The personnel who will be responsible for presenting reports and results to the Commission.

Cindy Fraterrigo, the Primary Actuary for the engagement, has been assigned overall responsibility for the work on this engagement. Cindy is based in our Chicago office. Cindy Fraterrigo and Brandon Robertson, the Secondary Actuary, will be responsible for presenting reports and results to the Commission.

Please refer to items 1 and 3 in the section titled, “Minimum Qualification Standards and Important Qualification Standards”, for detail on the team assigned to the engagement, their roles, and experience.

3) The personnel who will be assigned as replacements in the event of the subsequent employment termination by or the non-availability of the primary assigned personnel.

Jack Abraham has been assigned to back up Cindy and Brandon and replace them in the event of employment termination or non-availability.

Kyle Sherlock has been assigned to back up Gina Uhrich, the Project Manager assigned to the engagement, in the event of employment termination or non-availability.

Please refer to items 1 and 3 in the section titled, “Minimum Qualification Standards and Important Qualification Standards”, for detail on the team assigned to the engagement, their roles, and experience.

Actuarial Services Compensation

Actuarial Services Compensation

The contract will require that the actuarial firm provide all of the actuarial consulting services required by the Legislative Commission on Pensions and Retirement. The actuarial firm must indicate its specific required compensation amounts for the initial contract year and four subsequent years.

The following includes our proposed fee schedule for the initial year of the engagement:

Service	Compensation
Review of the Commission's Standards for Actuarial Work	$5,000
Review of the annual actuarial valuation reports for 11 plans annually	$42,500 *
Replication of the annual actuarial valuation report for 1 plan annually	$40,000 *
Review of the quadrennial experience studies for MSRS-General, PERA-General, and TRA	$25,000
Review of the actuarial cost estimates for proposed benefit, contribution, actuarial assumption, or other changes	Rate per hour
Review of optional annuity form table or annuity reserve factor changes	Rate per hour
Review of prior service credit purchase payment amount determination	Rate per hour
Review of privatization gains or losses	Rate per hour
Attendance at Commission meetings other than for presenting fixed fee projects	Rate per hour
Provision of advice and counsel to the Commission or the Commission staff on pension benefit design and funding issues	Rate per hour
Preparation of special studies requested by the Commission	Rate per hour

* Fixed fees will increase 3% per year for years 2-5 of the engagement.

Our fixed fee proposals are based on the assumption that the Commission and Commission staff will respond timely to any reasonable requests and inquiries way may have and that all of the information required for our work will be complete, made available to us in a timely manner, and in a usable format that does not require us to perform data entry.

Project with fees noted as "Rate per hour", as well as any other projects not identified above, will be charged at the following hourly rates:

Staff Level	Rate per hour
Primary and Secondary Actuary	$525 **
Senior level staff (credentialed actuaries)	$410 **
Junior level staff (non-credentialed actuaries)	$300 **

** Hourly rates will increase 3% per year for years 2-5 of the engagement.

1) A schedule of current hourly rates that the actuarial firm charges to its other current clients for each level of personnel anticipated to be assigned to this contract.

The schedule of hourly rates shown above is consistent with the hourly rates that we have negotiated with our other public sector clients.

2) A description of how any out-of-pocket expenses will be charged, if the out-of-pocket expense is not included in the fixed fee or the hourly fee.

Out-of-pocket travel expenses related to the annual kick off meeting and the results meeting with the Commission are included in our fixed fee schedule above.

Reasonable out-of-pocket travel expenses, including applicable sales, use, or value added taxes related to additional meetings will be billed to the Commission for reimbursement. PwC has negotiated favorable rates with certain air carriers, car rental agencies, and hotel chains in order to minimize travel expenses.

3) A description of how any computer expenses will be charged, if the computer expense is not included in the fixed fee or the hourly fee, with an indication of the items that will be includable as computer costs and an indication of the amount of computer charges per time unit.

No computer expenses will be charged to the Commission provided that all information required for the completion of our work is provided in a format that does not require us to purchase or license additional software. We prefer that all information provided to us is readable and editable using Microsoft Office (Word, Excel, Access, PowerPoint, etc.) software or a common PDF reader (e.g. Adobe).

4) A description of how development costs will be charged, if not included in the fixed or hourly fees, and the estimate of development costs arising out of the actuarial services contract for:

a. Any necessary changes to the firm's current computer systems.

No changes to our firm's computer systems will be charged to the Commission provided that all information required for the completion of our work is provided in a format that does not require us to purchase or license additional software. We prefer that all information provided to us is readable and editable using Microsoft Office (Word, Excel, Access, PowerPoint, etc.) software or a common PDF reader (e.g. Adobe).

b. Any necessary changes for data entry.

Projects with a fixed fee proposal assume that all of the information required for our work will be complete, made available to us in a timely manner, and in a usable format that does not require us to perform data entry.

In the event PwC is required to perform data entry, we will discuss with the Commssion and Commission staff the options of having the Commission staff perform the data entry to avoid additional charges, or authorizing PwC to perform the data entry at the junior staff level hourly rate shown above.

c. Gaining familiarization with the Minnesota pension plans and systems.

No additional cost will be charged to the Commission.

All time and expense associated with gaining familiarity with the Minnesota pension plans and systems within the scope of this engagement, as well as time and expense incurred developing internal working papers, reports and other reusable deliverables will be incurred by PwC.

d. Obtaining other data and information necessary to perform actuarial services and tasks.

Projects with a fixed fee proposal assume that the Commission and Commission staff will respond timely to any reasonable requests and inquiries way may have and that all of the information required for our work will be complete, made available to us in a timely manner, and in a usable format that does not require us to perform data entry. To the extent we are required to take extraordinary measures to retrieve the data and information necessary for our work, we will notify the Commission prior to doing so.

5) A description of the firm's billing practices, timing, and procedures.

Our standard practice is to render our invoies on a monthly basis. Payment of our invoices is due on presentation and expected to be received within 15 days of the invoice date.

Affirmative Action

Affirmative Action

In accordance with the provisions of Minnesota Statutes, Section 363A.36, no bid for a contract in excess of $100,000 may be accepted from an employer having more than 20 full-time employees at any time during the previous 12 months unless the employer has an affirmative action plan approved by the Minnesota Commissioner of Human Rights. The Commission will not accept a proposal unless it includes one of the following:

1) *A copy of the actuarial firm's current certificate of compliance issued by the Minnesota Commissioner of Human Rights; or*

2) *A notarized statement certifying that the actuarial firm has a current certificate of compliance issued by the Minnesota Commissioner of Human Rights; or*

3) *A notarized statement certifying that the actuarial firm has not had more than 20 full-time employees located in the State of Minnesota at any time during the 12 months prior to submission of the proposal.*

A copy of PwC's current certificate of compliance issued by the Minnesota Commissioner of Human Rights in presented on the following pages.

Minnesota Department of
HUMAN RIGHTS

February 20, 2013

PRICEWATERHOUSECOOPERS LLP
ATTN: Jason Capili
300 MADISON AVENUE
NEW YORK, NY 10017

Your organization's affirmative action plan has been approved by the Minnesota Department of Human Rights. The department's review of your equal employment opportunity policies and practices indicates compliance with Minnesota Statutes, Sec. 363A.36.

The Certificate of Compliance is enclosed. This certification is subject to revocation or suspension prior to its expiration if the department issues a finding of noncompliance or if your organization fails to make a good faith effort to implement its affirmative action plan.

Also enclosed is an Annual Report form to be completed and submitted annually during the certification period whether a state contract has been awarded to you or not. **You must submit reports as required and promptly notify us of any address or status changes.**

If you have any questions, please contact Compliance Services at 651-539-1095 or compliance.mdhr@state.mn.us.

Sincerely,

Kevin M. Lindsey, Commissioner
Minnesota Department of Human Rights

Enclosures: Certificate of Compliance
Annual Report Form
Posters (2)

Minnesota Department of
HUMAN RIGHTS

CERTIFICATE OF COMPLIANCE

PRICEWATERHOUSECOOPERS LLP is hereby certified as a contractor by the Minnesota Department of Human Rights. This certificate is valid from 2/19/2013 to 2/19/2015.

This certification is subject to revocation or suspension prior to its expiration if the department issues a finding of noncompliance or if your organization fails to make a good faith effort to implement its affirmative action plan.

Minnesota Department of Human Rights

FOR THE DEPARTMENT BY:

Kevin M. Lindsey, Commissioner

Workers' Compensation

Workers' Compensation

The successful proposer must submit acceptable evidence of compliance by the actuarial firm with the workers' compensation insurance coverage requirements of Minnesota law for any Minnesota employees before the execution of the contract.

We do not anticipate utilizing Minnesota employees for this engagement. The actuarial team assigned is based in Chicago, IL. However, PwC does carry workers' compensation insurance coverage and will submit a certificate of insurance evidencing compliance with the State of Minnesota's workers' compensation insurance coverage requirements before the execution of the contract.

Actuarial Valuation Capability

Actuarial Valuation Capability

An indication of the actuarial firm's capability to produce actuarial valuations and experience study reports as specified in Minnesota Statutes, Section 356.215, and the Current Commission Standards for Actuarial Work.

Cindy Fraterrigo, the Primary Actuary assigned to this engagement, is a Fellow of the Society of Actuaries and is regularly engaged in the business of providing actuarial services. As such, she satisfies the requirements to be an "approved actuary" under Minnesota Statutes, Section 356.215, as well as the Commission's current Standards for Actuarial Work.

In addition, we confirm that PwC, via the actuarial team assigned to this engagement, is capable of producing actuarial valuations and experience study reports that comply the the requirements of Minnesota Statutes, Section 356.215, and the Commission's current Standards for Actuarial Work. Please review the sample actuarial report in Appendix A and the sample experience study report in Appendix B as evidence.

Please note that PwC will perform its services in accordance with the Standards for Consulting Services established by the American Institute of Certified Public Accountants. Accordingly, PwC will not provide an audit or attest opinion or other form of assurance, and PwC will not verify or audit any information provided to PwC. PwC will not perform legal or advocacy services or any kind. The Commission is responsible for all management functions and decisions relating to this engagement, including evaluating and accepting the adequacy of the scope of the services in addressing its needs. The Commission is also responsible for the results achieved from using the services or deliverables, and it is the Commission's responsibility to establish and maintain its internal controls. The Commission will designate a competent member of its management to oversee the services. PwC will use practical and reasonably diligent efforts to meet the mutually agreed upon schedule or dates. However, schedules and dates in the resulting contract or statement of work are prospects used for planning purposes and, depending on the circumstances and cooperation by the Commission may need to be adjusted. PwC expects that the Commission will provide timely, accurate and complete information and reasonable assistance, and PwC will perform the engagement on that basis.

PwC is the U.S. firm of the global network of separate and independent PricewaterhouseCoopers firms (exclusive of PwC, the "Other PwC Firms"). PwC may draw on the resources of and/or subcontract to its subsidiaries, the Other PwC Firms and/or third party contractors and subcontractors (each, a "PwC Subcontractor"), in each case within or outside of the United States in connection with the provision of its services ("Services") and/or for internal, administrative and/or regulatory compliance purposes. The Commission agrees that PwC may provide information PwC receives in connection with the resulting agreement ("Agreement") to the PwC Subcontractors for such purposes. PwC will be solely responsible for the provision of the Services (including those performed by the PwC Subcontractors) and for the protection of the information provided to the PwC Subcontractors. The PwC Subcontractors and theirs and PwC's respective partners, principals or employees (collectively the "Beneficiaries") shall have no liability or obligations arising out of the Agreement. The Commission agrees to: (a) bring any claim or other legal proceeding of any nature arising from the Services against PwC and not against the Beneficiaries; and (b) ensure or procure that the Commission's consolidated subsidiaries or affiliates receiving services under this engagement who the Commission binds to the resulting subcontract by its signature (the "Subsidiaries") do not assert any such claim or other legal proceeding against PwC or the Beneficiaries. If any of the Subsidiaries receive Services under the Agreement, the Commission agrees to provide a copy of the Agreement to such Subsidiaries, and the Commission will notify them that although the Beneficiaries may interact with them, the delivery of the Services is governed by the terms of the

Agreement (including the liability limitations therein), and the Commission's Subsidiaries should notify the Commission of any disputes or potential claims arising from the Services. PwC disclaims any contractual or other responsibility or duty of care to any other subsidiaries or affiliates. While PwC is entering into the Agreement on its own behalf, this section also is intended for the benefit of the Beneficiaries.

Appendix A – Sample Actuarial Valuation Report

www.pwc.com

ABC Retirement System

ABC Retirement System Pension Fund

Actuarial Valuation as of
June 30, 2013

pwc

October 31, 2013

Board of Trustees
ABC Retirement System
<Street Address>
<City, State, Zip>

Re: Certification of the Actuarial Valuation of the ABC Retirement System Pension Fund as of as of June 30, 2013

Dear Board of Trustees:

Actuarial valuations are performed annually for the ABC Retirement System Pension Fund ("ABC Fund"). The results of the latest actuarial valuation was prepared as of June 30, 2013 and is presented in this report, pursuant to the engagement letter between the ABC Retirement System ("ABC") and PricewaterhouseCoopers LLP ("PwC"), dated <Date>. The reports are intended to provide the Board of Trustees ("Board") with information on the funded status of the ABC Fund, development of the contribution rates, and certain financial statement disclosure information.

Under statute, employer contribution rates and amounts, as applicable, are adopted annually for the ABC Fund by the Board. The contributions are actuarially determined based on the funding policy, actuarial assumptions, and actuarial methods adopted by the Board. Contributions determined by the actuarial valuation become effective twelve months after the valuation date. Therefore, contribution rates determined by the June 30, 2013 actuarial valuation and adopted by the Board will become effective on July 1, 2014. If new legislation is enacted between the valuation date and the date the contributions become effective, the Board may adjust the recommended contributions before adopting them, in order to reflect this new legislation. Such adjustments are based on information supplied by the actuary.

Financing Objectives and Funding Policy

In setting contribution levels, the Board's principal objectives have been:

- To set contributions such that the unfunded actuarial accrued liability ("UAAL") will be amortized over a period not greater than 30 years.
- To set contributions such that they remain relatively level over time.

To accomplish this, the Board's funding policy requires that employer contributions be equal to the sum of the employer normal cost (which pays the current year cost of benefits accruing) and an amortization of the UAAL in equal installments.

Progress Toward Realization of Financing Objectives

The funded ratio (the ratio of the actuarial value of assets to the actuarial accrued liability) is a standard measure of the ABC Fund's funded status. In the absence of benefit improvements, it should increase over time, until it reaches 100%. The funded ratio for the ABC Fund increased by 3.3% from the preceding year to 95.2%, primarily due to delayed recognition of prior asset gains from fiscal 2010 and 2011 in the Actuarial Value of Assets.

Benefit Provisions

The benefit provisions reflected in the valuation reports are those which were in effect at June 30, 2013, as set forth in the applicable statutes. There were no material changes in benefit provisions since the prior valuation. A summary of the benefit provisions is presented in Section VI of this report.

Assets and Member Data

The valuations were based on asset values of the trust fund and member census data as of June 30, 2013. All asset information and member data were provided by ABC. While certain checks for reasonableness were performed, the data was used unaudited. The accuracy of the results presented in the reports is dependent upon the accuracy and completeness of the underlying asset and census information. A summary of ABC Fund members is presented in Section IV of this report.

Actuarial Assumptions and Methods

The majority of the actuarial assumptions used in the June 30, 2013 valuations were adopted by the Board pursuant to the Experience Study completed in September 2011, which reflected the experience period from July 1, 2005 through June 30, 2010. Those assumptions were furst used in the June 30, 2011 valuation. The actuarial assumptions and methods are summarized in Section V of this report.

We believe the actuarial assumptions and methods are reasonable for the purposes of the valuation reports and comply with the parameters set forth in Statements No. 25 and No. 27 of the Governmental Accounting Standards Board ("GASB"). Different assumptions and methods may be reasonable for other purposes. As such, the results presented in the valuation reports should only be relied upon for the intended purpose.

Certification

We certify that the information presented herein is accurate and fairly portrays the actuarial position of the ABC Fund administered by ABC as of June 30, 2013, based on the underlying census data, asset information and selected assumptions and methods.

This report contains the required accounting information to be included in the Comprehensive Annual Financial Report. This information has been prepared in accordance with our understanding of Governmental Accounting Standards No. 25 and No. 27 (as amended by No. 50). This report does not contain accounting information prepared in accordance with Governmental Accounting Standards No. 67 and No. 68, which will become effective for financial statements for fiscal years beginning after June 15, 2013 and June 15, 2014, respectively.

To the best of our knowledge this actuarial statement is complete and accurate and has been prepared in accordance with generally accepted actuarial principles and practice and with the Actuarial Standards of Practice issued by the Actuarial Standards Board. In our opinion, our calculations also comply with our understanding of the requirements of state law. The undersigned actuaries are members of the Society of Actuaries and other professional organizations, including the American Academy of Actuaries, and meet the Qualification Standards for Actuaries Issuing Statements of Actuarial Opinion in the United States relating to pension plans. There is no relationship between the PwC practitioners involved in this engagement and ABC that may impair our objectivity.

This document was not intended or written to be used, and it cannot be used, for the purpose of avoiding U.S. federal, state, or local tax penalties. This includes penalties that may apply if the transaction that is the subject of this document is found to lack economic substance or fails to satisfy any other similar rule of law. This document has been prepared pursuant to an engagement letter between ABC and PwC, and is intended solely for the use and benefits of ABC and not for reliance by any other person.

Respectfully submitted,

<Name of Signing Actuary> <Credentials>	<Name of Signing Actuary> <Credentials>	<Name of Signing Actuary> <Credentials>

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HIGHLIGHTS OF THE ACTUARY'S REPORT

This report presents the results of the actuarial valuation of the ABC Retirement System Pension Fund (the "ABC Fund") and has been prepared to present the current funded status of the Plan, contribution requirements for fiscal year 2015 (July 1, 2014 through June 30, 2015), and certain financial statement disclosure information. The valuation was performed using census data for plan members as of June 30, 2013 provided by ABC, asset information as of June 30, 2013 provided by ABC, the actuarial assumptions and methods approved by the Board and summarized in Section V, and the plan provisions effective June 30, 2013 as summarized in Section VI.

Contribution Rate

The Board sets, at its discretion, the applicable employer contribution rate upon considering the results of the actuarial valuation and other analysis as appropriate. The Board approved an employer contribution rate of 19.7% for fiscal year 2015, the same as fiscal 2014. The contribution rate becomes effective on July 1, 2014. Therefore, the actual dollar amount of employer cost will depend on the actual payroll during fiscal year 2015.

Members of the ABC Fund contribute 6% of the compensation of a first class officer during their first 32 years of service. However, the employer may elect to "pick-up" all or part of the employee contribution. If a member terminates employment with less than 20 years of service, the accumulated contributions with interest can be withdrawn as a lump sum or the member may direct the ABC Fund to make a direct rollover of the distribution amount. When a member becomes vested with at least 20 years of service, the member's account balance may not be refunded and is instead combined with the employer contributions in order to fund the member's future retirement annuity benefit.

Funded Status

The funded status of the ABC Fund is measured by the funded ratio, which is the ratio of the assets available for benefits to a benefit liability measure for the ABC Fund. While there are several such measures that could be appropriately used, the benefit liability measure that ties most closely to ABC's funding strategy is the Actuarial Accrued Liability (“AAL”).

Using the Actuarial Value of Assets ("AVA"), an asset value that smoothes the market gains and losses over four (4) years, the ABC Fund AAL funded ratio increased from 91.9% at June 30, 2012 to 95.2% at June 30, 2013. The increase is primarily due to the recognition of investment gains from prior years in the AVA development and demographic gains.

Investment Experience

Based on the value of assets associated with the ABC Fund as of the prior valuation date and contribution and benefit payment activity during the year, the allocation of returns to the ABC Fund represent a return of approximately 5.7% on market value and 8.3% on actuarial value. The return on actuarial value is different due to the smoothing of returns greater or less than expected returns over four years.

HIGHLIGHTS OF THE ACTUARY'S REPORT (CONTINUED)

Cost-of-Living Adjustment

Benefits for retired members are increased annually based on increases in the CPI-U index. The increase is subject to a 3% maximum and 0% minimum. There was a 1.7% increase in monthly benefits provided to retired members, disabled members, and beneficiaries effective July 1, 2013. There was a 2.8% increase in monthly benefits provided to retired members, disabled members, and beneficiaries effective July 1, 2012.

Changes in Actuarial Assumptions

The interest crediting rate assumption on member contribution balances was lowered from 5.5% to 3.5%.

There were no other assumption changes for the June 30, 2013 valuation.

Changes in Plan Provisions

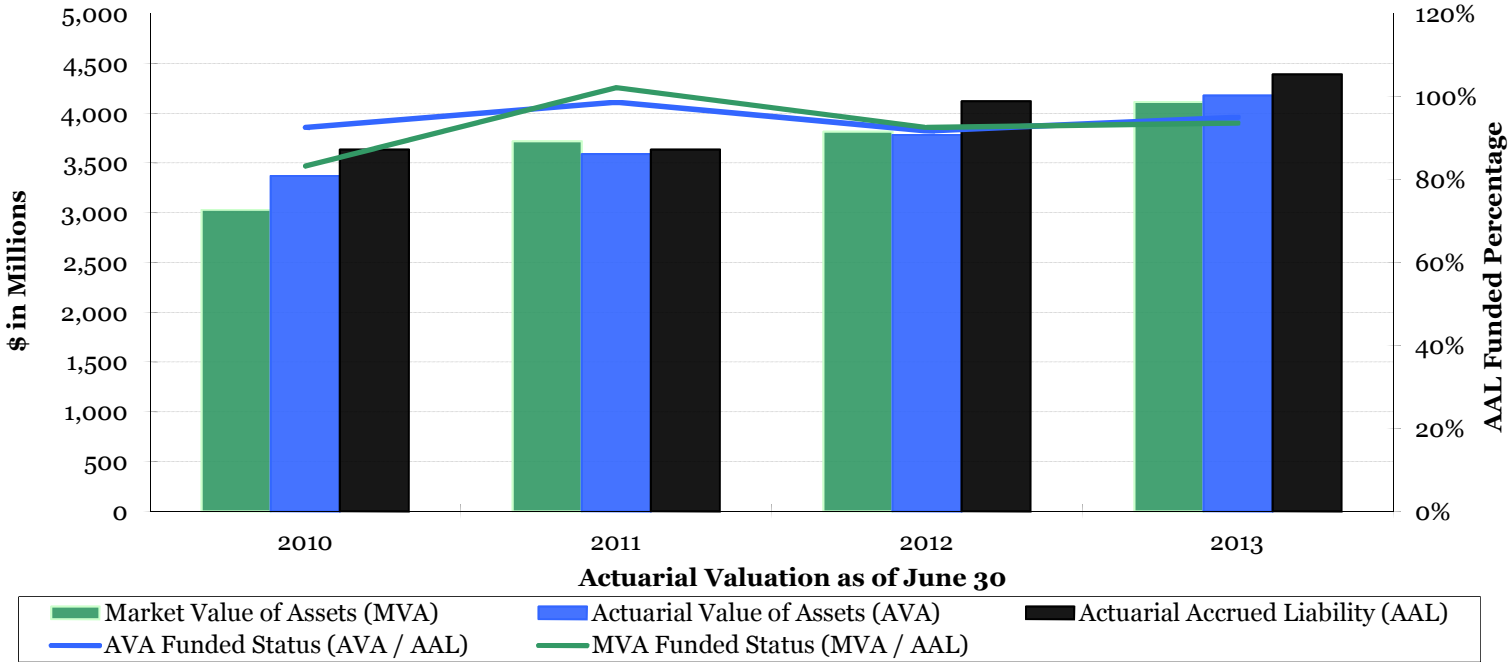
It is our understanding that there were no changes to the Plan that impacted the pension benefits during the fiscal year.

Changes in Actuarial Methods

There have been no changes in the actuarial methods since the June 30, 2012 valuation.

HISTORICAL SUMMARY

ABC Fund – 4 Year History of Funded Status



Actuarial Valuation as of June 30:	2010	2011	2012	2013
Actuarial Accrued Liability (AAL)	$3,639.7	$3,639.0	$4,122.4	$4,392.9
Actuarial Value of Assets (AVA)	3,374.4	3,593.8	3,786.6	4,180.7
Market Value of Assets (MVA)	3,033.3	3,721.4	3,817.0	4,116.9
Unfunded Liability (AAL - AVA)	265.3	45.2	335.8	212.2
AVA Funded Status (AVA / AAL)	92.7%	98.8%	91.9%	95.2%
MVA Funded Status (MVA / AAL)	83.3%	102.3%	92.6%	93.7%

HISTORICAL SUMMARY (CONTINUED)

Summary of Valuation Results [1]

Valuation Date	June 30, 2010	June 30, 2011	June 30, 2012	June 30, 2013
Development of Annual Required Contribution Rate:				
1. Anticipated Payroll [2]	$ 675,797,434	$ 687,342,353	$ 697,111,339	$ 706,603,233
2. Normal Cost (Beginning of Year)				
a. Amount	$ 154,421,923	$ 123,438,234	$ 130,912,451	$ 133,074,656
b. Percentage of Payroll	22.85%	17.96%	18.78%	18.83%
3. Unfunded Actuarial Accrued Liability Annual Amortizations				
a. Amount	$ 20,029,260	$ 3,671,206	$ 25,053,170	$ 16,255,805
b. Percentage of Payroll	2.96%	0.53%	3.59%	2.30%
4. Expected Employee Contributions [3]				
a. Amount	$ 40,547,846	$ 40,582,006	$ 40,821,968	$ 40,636,183
b. Percentage of Payroll	6.00%	5.90%	5.85%	5.75%
5. Annual Required Contribution Rate:				
a. Percentage of Payroll: (2)(b) + (3)(b) - 4(b)	**19.81%**	**12.59%**	**16.52%**	**15.38%**
b. Effective Date	January 1, 2012	January 1, 2013	January 1, 2014	January 1, 2015

Fiscal Year	2012	2013	2014	2015
Approved Funding Rate [4]	**19.70%**	**19.70%**	**19.70%**	**19.70%**

[1] The contribution rates shown were developed on a funding basis only and do not reflect acounting requirements

[2] For the ABC Fund, payroll is the applicable first class officer pay for each member.

[3] Only members with less than 32 years of service contribute to the plan. Current payroll for active members with less than 32 years of service as of June 30, 2013 is $677,269,709.

[4] The Approved Funding Rates shown are based on the first class officer payroll as of the respective valuation date.

HISTORICAL SUMMARY (CONTINUED)

Summary of Valuation Results (Continued)

Census Information	June 30, 2010	June 30, 2011	June 30, 2012	June 30, 2013
Active				
Number	13,362	13,376	13,390	13,287
Average Age	40.6	41.1	41.1	41.9
Average Years of Service	13.1	13.6	13.6	14.4
Covered Payroll of Actives [1]	$ 675,797,434	$ 687,342,353	$ 697,111,339	$ 706,603,233
Inactive - Vested				
Number	111	126	122	129
Average Age	49.8	50.2	50.1	49.9
Average Years of Service	22.3	22.8	22.4	22.6
Inactive - Non-Vested [2]				
Number	771	791	751	796
Retiree/Beneficiary/Disabled				
Number	2,782	2,966	3,208	3,491
Average Age	61.3	61.5	61.7	61.7
Annual Benefits Payable	$ 60,220,091	$ 68,178,739	$ 76,916,985	$ 87,301,272

[1] For the ABC Fund, payroll is the applicable first class officer pay for each member.

[2] For June 30, 2013, inactive non-vested members entitled to a refund of their member contribution balances totaling $6,733,809.

HISTORICAL SUMMARY (CONTINUED)

Summary of Valuation Results (Continued)

	June 30, 2010	June 30, 2011	June 30, 2012	June 30, 2013
Actuarial Accrued Liability (AAL)				
Member Contribution Balance	$ 634,864,721	$ 679,848,776	$ 728,891,808	$ 782,124,168
Retiree/Beneficiary/Disabled	859,626,595	970,676,496	1,135,537,898	1,288,456,658
Active and Inactive	2,145,177,957	1,988,431,007	2,258,006,406	2,322,366,151
Total	$ 3,639,669,273	$ 3,638,956,279	$ 4,122,436,112	$ 4,392,946,977
Actuarial Value of Assets (AVA)				
Member Contribution Balance	$ 634,864,721	$ 679,848,776	$ 728,891,808	$ 782,124,168
Retiree/Beneficiary/Disabled	859,626,595	970,676,496	1,135,537,898	1,288,456,658
Active and Inactive	1,879,946,523	1,943,261,593	1,922,164,986	2,110,122,792
Total	$ 3,374,437,839	$ 3,593,786,865	$ 3,786,594,692	$ 4,180,703,618
Market Value of Assets (MVA)				
Member Contribution Balance	$ 634,864,721	$ 679,848,776	$ 728,891,808	$ 782,124,168
Retiree/Beneficiary/Disabled	859,626,595	970,676,496	1,135,537,898	1,288,456,658
Active and Inactive	1,538,793,947	2,070,841,180	1,952,583,928	2,046,280,295
Total	$ 3,033,285,263	$ 3,721,366,452	$ 3,817,013,634	$ 4,116,861,121
Unfunded Actuarial Accrued Liability: AAL - AVA				
Member Contribution Balance	$ -	$ -	$ -	$ -
Retiree/Beneficiary/Disabled	-	-	-	-
Active and Inactive	265,231,434	45,169,414	335,841,420	212,243,359
Total	$ 265,231,434	$ 45,169,414	$ 335,841,420	$ 212,243,359
Funded Percentage				
Member Contribution Balance	100.0%	100.0%	100.0%	100.0%
Retiree/Beneficiary/Disabled	100.0%	100.0%	100.0%	100.0%
Active and Inactive	87.6%	97.7%	85.1%	90.9%
Total	92.7%	98.8%	91.9%	95.2%
Summary of Assumptions				
Valuation Interest Rate	7.0%	7.0%	6.75%	6.75%
Salary Scale	4.0%	3.25%	3.25%	3.25%
Cost-of-Living Assumption	2.25%	2.25%	2.25%	2.25%

FUNDING

SECTION II - FUNDING

A. Development of Funded Status

		June 30, 2012	June 30, 2013
1.	Actuarial Accrued Liability		
a.	Member Contribution Balances	728,891,808	782,124,168
b.	Retirees, Beneficiaries, and Disableds	1,135,537,898	1,288,456,658
c.	Actives and Inactives	2,258,006,406	2,322,366,151
d.	Total: (1)(a) + (1)(b) + (1)(c)	$ 4,122,436,112	$ 4,392,946,977
2.	Actuarial Value of Assets [1]		
a.	Member Contribution Balances	728,891,808	782,124,168
b.	Retirees, Beneficiaries, and Disableds	1,135,537,898	1,288,456,658
c.	Actives and Inactives	1,922,164,986	2,110,122,792
d.	Total: (2)(a) + (2)(b) + (2)(c)	$ 3,786,594,692	$ 4,180,703,618
3.	Unfunded Actuarial Accrued Liability [1]		
a.	Member Contribution Balances: (1)(a) - (2)(a)	-	-
b.	Retirees, Beneficiaries, and Disableds: (1)(b) - (2)(b)	-	-
c.	Actives and Inactives: (1)(c) - (2)(c)	335,841,420	212,243,359
d.	Total: (1)(d) - (2)(d)	$ 335,841,420	$ 212,243,359
4.	Funded Percentage [1]		
a.	Member Contribution Balances: (2)(a) / (1)(a)	100.0%	100.0%
b.	Retirees, Beneficiaries, and Disableds: (2)(b) / (1)(b)	100.0%	100.0%
c.	Actives and Inactives: (2)(c) / (1)(c)	85.1%	90.9%
d.	Total: (2)(d) / (1)(d)	91.9%	95.2%

[1] In determining the funded percentage, the assets are allocated first to member contribution balances, then to the retiree/beneficiary/disabled liability, and then to the active/inactive liability.

B. Unfunded Actuarial Accrued Liability Reconciliation

		June 30, 2012	June 30, 2013
1.	Unfunded Actuarial Accrued Liability, Prior Year	$ 45,169,414	$ 335,841,420
2.	Unfunded Actuarial Accrued Liability (Gain) / Loss		
	a. Actuarial Value of Assets Experience	$ 103,601,302	$ (75,191,747)
	b. Actuarial Accrued Liability Experience	544,029	(33,361,789)
	c. Additional Liability Due to Cost-of-living Adjustments	5,226,296 [1]	(6,159,321) [3]
	d. Additional Liability Due to Changes in Actuarial Assumptions	182,066,710 [2]	(4,810,241) [4]
	e. Additional Liability Due to Changes in Plan Provisions	-	-
	f. Total New Amortization Bases: (2)(a) + (2)(b) + (2)(c) + (2)(d) + (2)(e)	$ 291,438,337	$ (119,523,098)
	g. Reduction in Existing Bases Due to Prior Year Contributions, Net of Interest	(766,331)	(4,074,963)
	h. Change in Unfunded Actuarial Accrued Liability: (2)(f) + (2)(g)	$ 290,672,006	$ (123,598,061)
3.	Unfunded Actuarial Accrued Liability, Current Year: (1) + (2)(h)	$ 335,841,420	$ 212,243,359

[1] A Cost-of-Living Adjustment (COLA) of 2.8% was effective as of July 1, 2012, rather than the assumed COLA of 2.25%.

[2] Assumption changes include the change in discount rate from 7.0% to 6.75% and change in mortality table from the 2008 IRS Static Mortality projected five (5) years with Scale AA to the 2013 IRS Static Mortality projected five (5) years with Scale AA.

[3] A Cost-of-Living Adjustment (COLA) of 1.7% was effective as of July 1, 2013, rather than the assumed COLA of 2.25%.

[4] The interest crediting rate assumption on member contribution balances was lowered from 5.5% to 3.5%.

C. Actuarial Accrued Liability Reconciliation

1.	June 30, 2012 Actuarial Accrued Liability	$	4,122,436,112	
2.	Normal Cost		130,912,451	
3.	Actual Benefit Payments		99,802,915	
4.	Interest of 6.75% on (1) + (2) - (3)/2		283,732,680	
5.	Expected June 30, 2013 Actuarial Accrued Liability: (1) + (2) - (3) + (4)	$	4,437,278,328	
			Dollar Change in Liability	Percent Change in Liability
6.	(Gain)/Loss Components			
	a. Census	$	(33,361,789)	(0.8%)
	b. Cost-of-Living Adjustment [1]		(6,159,321)	(0.1%)
	c. Assumption Changes [2]		(4,810,241)	(0.1%)
	d. Total: (6)(a) + (6)(b) + (6)(c)	$	(44,331,351)	(1.0%)
7.	Actual June 30, 2013 Actuarial Accrued Liability: (5) + (6)(d)	**$**	**4,392,946,977**	

[1] A Cost-of-Living Adjustment (COLA) of 1.7% was effective as of July 1, 2013, rather than the assumed COLA of 2.25%.

[2] The interest crediting rate assumption on member contribution balances was lowered from 5.5% to 3.5%.

D. Reconciliation of Market Value of Assets

		June 30, 2012	June 30, 2013
1.	Market Value of Assets, Prior June 30	$ 3,721,366,452	$ 3,817,013,634
2.	Receipts		
	a. Employer Contributions	$ 135,605,408	$ 137,110,691
	b. Member Contributions	40,870,404	40,786,098
	c. Investment Income and Dividends Net of Fees	7,488,730	222,561,993
	d. Security Lending Income Net of Fees	1,261,257	947,682
	e. Transfers In	122,235	71,001
	f. Miscellaneous Income	41,557	17,995
	g. Total Receipts: (2)(a) + (2)(b) + (2)(c) + (2)(d) + (2)(e) + (2)(f)	$ 185,389,591	$ 401,495,460
3.	Disbursements		
	a. Benefits Paid During the Year	$ 84,945,768	$ 96,729,220
	b. Refund of Contributions and Interest	3,101,722	3,073,695
	c. Administrative and Project Expenses	1,662,166	1,845,058
	d. Transfers Out	32,753	-
	e. Miscellaneous Disbursements	-	-
	f. Total Disbursements: (3)(a) + (3)(b) + (3)(c) + (3)(d) + (3)(e)	$ 89,742,409	$ 101,647,973
4.	Market Value of Assets, Current June 30: (1) + (2)(g) - (3)(f)	**$ 3,817,013,634**	**$ 4,116,861,121**
5.	Market Value of Assets Approximate Annual Rate of Return [1]	0.2%	5.7%

[1] Assumes cash flows occur at mid-year.

E. Reconciliation of Actuarial Value of Assets

1.	Market Value of Assets, June 30, 2012			$	3,817,013,634
2.	Market Value of Assets, June 30, 2013				4,116,861,121
3.	Expected Earnings/Expenses				
	a. Expected Investment Earnings at 6.75% on June 30, 2012 Market Value				257,648,420
	b. Receipts with Expected Investment Earnings at 6.75%[1]				183,992,805
	c. Disbursements with Expected Investment Earnings at 6.75%[1]				103,171,263
4.	Expected Assets, June 30, 2013: (1) + (3)(a) + (3)(b) - (3)(c)			$	4,155,483,596
5.	2012-2013 Gain/(Loss): (2) - (4)				(38,622,475)
6.	Smoothing of Gain/(Loss)				
		Year	Gain/(Loss)	% Unrecognized	
	a.	2012-2013	$ (38,622,475)	75%	(28,966,856)
	b.	2011-2012	$ (256,507,408)	50%	(128,253,704)
	c.	2010-2011	$ 373,512,250	25%	93,378,063
7.	Preliminary Actuarial Value of Assets, June 30, 2013: (2) - (6)(a) - (6)(b) - (6)(c)			$	4,180,703,618
8.	Corridor				
	a. 120% of Market Value: 1.2 x (2)				4,940,233,345
	b. 80% of Market Value: 0.8 x (2)				3,293,488,897
9.	Actuarial Value of Assets, June 30, 2013: (7), but not greater than (8)(a) or less than (8)(b)			**$**	**4,180,703,618**
10.	Actuarial Value of Assets as a Percent of Market Value: (9) / (2)				101.6%
11.	Actuarial Value of Assets Approximate Annual Rate of Investment Return [1]				8.3%

[1] Assumes cash flows occur at mid-year.

F. Contribution Rate

	June 30, 2012	June 30, 2013
Development of Annual Required Contribution Rate:		
1. Anticipated Payroll [1]	$ 697,111,339	$ 706,603,233
2. Normal Cost (Beginning of Year)		
a. Amount	$ 130,912,451	$ 133,074,656
b. Percentage of Payroll	18.78%	18.83%
3. Unfunded Actuarial Accrued Liability (UAAL) Annual Amortizations		
a. Amount	$ 25,053,170	$ 16,255,805
b. Percentage of Payroll	3.59%	2.30%
4. Expected Employee Contributions [2]		
a. Amount	$ 40,821,968	$ 40,636,183
b. Percentage of Payroll	5.85%	5.75%
5. Annual Required Contribution Rate:		
a. Percentage of Payroll: (2)(b) + (3)(b) - 4(b)	**16.52%**	**15.38%**
b. Effective Date	January 1, 2014	January 1, 2015
Approved Funding Rate:	**19.70%**	**19.70%**
Expected Percentage of Annual Required Contribution Contributed:		
6. Fiscal Year Beginning	July 1, 2013	July 1, 2014
7. Annual Required Contribution Rates for:		
a. July 1 - December 31	0.00%	16.52%
b. January 1 - June 30	16.52%	15.38%
8. Approved Funding Rates for:		
a. July 1 - December 31	19.70%	19.70%
b. January 1 - June 30	19.70%	19.70%
9. Expected Percentage of Annual Required Contribution Contributed: {[(8)(a) + (8)(b)] / 2} / {[(7)(a) + (7)(b)] / 2}	238.50%	123.51%

[1] For the ABC Fund, payroll is the applicable first class officer pay for each member.

[2] Only members with less than 32 years of service contribute to the plan. Current payroll for active members with less than 32 years of service as of June 30, 2013 is $677,269,709.

G. Unfunded Actuarial Accrued Liability Amortization Schedule

	Date Base Established	Reason	Remaining Unfunded	Remaining Period	Amortization Amount
1.	6/30/2009	Actuarial Experience	$ 63,929,827	26	$ 4,947,819
2.	6/30/2010	Actuarial Experience and Changes in Actuarial Assumptions	191,954,296	27	14,648,746
3.	6/30/2011	Actuarial Experience and Changes in Actuarial Assumptions	(212,329,153)	28	(15,994,391)
4.	6/30/2012	Actuarial Experience and Changes in Actuarial Assumptions	288,211,487	29	21,450,996
5.	6/30/2013	Actuarial Experience and Changes in Actuarial Assumptions	(119,523,098)	30	(8,797,365)
	Total		$ 212,243,359		$ 16,255,805

H. History of Employer Contribution Rates [1, 2]

1. Valuation Date	2. Effective Date	3. Contribution Rate
June 30, 2000	July 1, 2001	21.0%
June 30, 2001	July 1, 2002	21.0%
June 30, 2002	July 1, 2003	21.0%
June 30, 2003	July 1, 2004	21.0%
June 30, 2004	July 1, 2005	21.0%
June 30, 2005	July 1, 2006	21.0%
June 30, 2006	July 1, 2007	19.5%
June 30, 2007	July 1, 2008	19.5%
June 30, 2008	July 1, 2009	19.5%
June 30, 2009	July 1, 2010	19.5%
June 30, 2010	July 1, 2011	19.7%
June 30, 2011	July 1, 2012	19.7%
June 30, 2012	July 1, 2013	19.7%
June 30, 2013	July 1, 2014	19.7%

[1] Valuation results prior to June 30, 2010 were calculated by the prior actuary.

[2] Prior to the June 30, 2011 valuation date, rates shown reflect application of the contribution rate smoothing rules.

I. Approximate Annual Rate of Return for Year Ending June 30, 2013 [1]

		Market Value of Assets	Actuarial Value of Assets
1.	Balance, beginning of year	$ 3,817,013,634	$ 3,786,594,692
2.	Balance, end of year	4,116,861,121	4,180,703,618
3.	Total increase: (2) - (1)	299,847,487	394,108,926
4.	Contributions and Transfers In	177,985,785	177,985,785
5.	Benefit payments and Transfers Out	99,802,915	99,802,915
6.	Net additions: (4) - (5)	78,182,870	78,182,870
7.	Net investment increase: (3) - (6)	221,664,617	315,926,056
8.	Average assets: [(1) + (2) - (7)] / 2	3,856,105,069	3,825,686,127
9.	Approximate rate of return: (7) / (8)	5.7%	8.3%

J. Historical Investment Experience

1.	2.	3.	4.
	Actual Rate of Investment Return		Actuarial Assumed
Year Ending	Market Basis	Actuarial Basis	Interest Rate
June 30, 2003	24.2%	2.9%	7.25%
June 30, 2004	11.9%	4.9%	7.25%
June 30, 2005	7.8%	13.5%	7.25%
June 30, 2006	13.7%	15.5%	7.25%
June 30, 2007	6.3%	10.8%	7.25%
June 30, 2008	(30.8%)	(1.2%)	7.25%
June 30, 2009	(20.6%)	0.2%	7.25%
June 30, 2010	13.9%	0.1%	7.25%
June 30, 2011	20.1%	3.5%	7.0%
June 30, 2012	0.2%	2.9%	7.0%
June 30, 2013	5.7%	8.3%	6.75%

[1] Net of expenses and assuming cash flows occur at mid-year.

K. Interest Rate Sensitivity

The investment return assumption (discount rate), as required by GASB, should be based on an estimated long-term investment yield for the plan, with consideration given to the nature and mix of current and expected plan investments. Management and the Board continually monitor the investment rate of return assumption and the Board formally reviews the assumption and makes changes as appropriate. The Board last changed the assumption for the June 30, 2012 valuation from 7.0% to 6.75%.

To illustrate the importance of the investment rate of return, which is used to discount the actuarial liabilities of the Plan, the Funded Ratio and Annual Required Contribution (for the fiscal year beginning July 1, 2015) are shown below at 6.75% (the current assumption), 6.0% (a three-fourths of a percent decrease), 6.5% (a one-fourth of a percent decrease), 7.5% (a three-fourths of a percent increase), and 8.0% (a one and one-fourth of a percent increase).

	0.75% Decrease: (6.0%)	0.25% Decrease: (6.5%)	Current Assumption: (6.75%)	0.75% Increase: (7.5%)	1.25% Increase: (8.0%)
Funded Status					
Actuarial Accrued Liability	$ 4,933,825,519	$ 4,563,651,603	$ 4,392,946,977	$ 3,931,611,126	$ 3,661,471,787
Actuarial Value of Assets	4,180,703,618	4,180,703,618	4,180,703,618	4,180,703,618	4,180,703,618
Unfunded Actuarial Accrued Liability	$ 753,121,901	$ 382,947,985	$ 212,243,359	$ (249,092,492)	$ (519,231,831)
Funded Ratio	84.7%	91.6%	95.2%	106.3%	114.2%
Annual Required Contribution Rate					
Normal Cost Percentage	22.91%	20.09%	18.83%	15.59%	13.80%
UAAL Amortization Percentage [1]	7.41%	3.99%	2.30%	0.00%	0.00%
Expected Employee Contribution Percentage	5.75%	5.75%	5.75%	5.75%	5.75%
Annual Required Contribution Percentage	24.57%	18.33%	15.38%	9.84%	8.05%

[1] Amortization bases were assumed to be eliminated in scenarios where the funded ratio exceeds 100%.

ACCOUNTING

REQUIRED SUPPLEMENTARY INFORMATION UNDER GASB #25 AND #27

A. Assumptions and Methods Under GASB #25 and #27

Under the Governmental Accounting Standards Board (GASB) Statements No. 25 and No. 27, as amended by GASB No. 50, certain information about the ABC Fund is required to be disclosed. The information presented in the required supplementary schedules was determined as part of the actuarial valuations at the dates indicated. Additional information as of the latest actuarial valuation follows:

Valuation Date	June 30, 2013
Actuarial Cost Method	Entry Age Normal (Level Percent of Payroll)
Amortization Method	Level Dollar
Amortization Period	30 Years, Closed
Actuarial Value of Assets	4-Year Smoothed Market Value with 20% Corridor
Actuarial Assumptions:	
Investment Rate of Return	6.75%
Future Salary Increases	3.25% (includes 3.0% wage inflation)
Cost-of-Living Increases	2.25% compounded annually

B. Membership Data

The plan consisted of the following membership as of June 30, 2013, the date of the latest actuarial valuation:

Retired members, beneficiaries and disabled members receiving benefits:	3,491
Terminated vested plan members entitled to but not yet receiving benefits:	129
Terminated non-vested plan members entitled to a distribution of contributions:	796
Active Plan Members:	13,287
Total membership:	17,703

REQUIRED SUPPLEMENTARY INFORMATION UNDER GASB #25 AND #27 (CONTINUED)

C. Statement of Fiduciary Net Position

1.	Assets		
	a. Cash	$	1,277,183
	b. Receivables		
	i. Contributions Receivable	$	3,699,825
	ii. Miscellaneous Receivables		64,755
	iii. Investments Receivable		433,493,522
	iv. Interest and Dividends		13,025,302
	v. Due From Other Funds		59,079
	vi. Total Receivables: (1)(b)(i) + (1)(b)(ii) + (1)(b)(iii) + (1)(b)(iv) + (1)(b)(v)	$	450,342,483
	c. Total Investments		4,414,486,006
	d. Net Capital Assets		339,539
	e. Total Assets: (1)(a) + (1)(b)(vi) + (1)(c) + (1)(d)	$	4,866,445,211
2.	Liabilities		
	a. Accounts Payable	$	61,901
	b. Retirement Benefits Payable		7,136
	c. Salaries and Benefits Payable		-
	d. Investments Payable		509,622,554
	e. Securities Lending Obligations		206,268,156
	f. Securities Sold Under Agreement to Repurchase		33,028,922
	g. Due To Other Funds		595,421
	h. Total Liabilities: (2)(a) + (2)(b) + (2)(c) + (2)(d) + (2)(e) + (2)(f) + (2)(g)	$	749,584,090
3.	Net Position Restricted for Pension Benefits: (1)(e) - (2)(h)	**$**	**4,116,861,121**

REQUIRED SUPPLEMENTARY INFORMATION UNDER GASB #25 AND #27 (CONTINUED)

D. Statement of Changes in Fiduciary Net Position

1.	Net Position as of June 30, 2012	$	3,817,013,634
2.	Revenue (Additions)		
	a. Contributions		
	i. Member Contributions	$	40,786,098
	ii. Employer Contributions		137,110,691
	iii. Other Contributions		-
	iv. Total Contributions: (2)(a)(i) + (2)(a)(ii) + (2)(a)(iii)	$	177,896,789
	b. Investment Income/Loss		
	i. Investment Income/Loss	$	246,484,619
	ii. Securities Lending Income		1,114,630
	iii. Securities Lending Expenses		(166,948)
	iv. Other Investment Expenses		(23,922,626)
	v. Net Investment Income: (2)(b)(i) + (2)(b)(ii) + (2)(b)(iii) + (2)(b)(iv)	$	223,509,675
	c. Other Additions		
	i. Interfund Transfers	$	71,001
	ii. Miscellaneous Income		17,995
	iii. Total Other Additions: (2)(c)(i) + 2(c)(ii)	$	88,996
	d. Total Revenue (Additions): (2)(a)(iv) + (2)(b)(v) + (2)(c)(iii)	$	401,495,460
3.	Expenses (Deductions)		
	a. Pension and Disability Benefits	$	95,934,820
	b. Death, Survivor, and Funeral Benefits		794,400
	c. Distributions of Contributions and Interest		3,073,695
	d. Interfund Transfers		-
	e. Pensions Relief Distributions		-
	f. Local Unit Withdrawals		-
	g. Administrative and Project Expenses		1,845,058
	h. Total Expenses (Deductions): (3)(a) + (3)(b) + (3)(c) + (3)(d) + (3)(e) + (3)(f) + (3)(g)	$	101,647,973
4.	Changes in Net Position Restricted for Pension Benefits: (2)(d) - (3)(h)	$	299,847,487
5.	Net Position as of June 30, 2013: (1) + (4)	**$**	**4,116,861,121**

REQUIRED SUPPLEMENTARY INFORMATION UNDER GASB #25 AND #27 (CONTINUED)

E. Schedule of Funding Progress [1]

1. Actuarial Valuation Date	2. Actuarial Value of Assets	3. Actuarial Accrued Liability (AAL)	4. Unfunded Actuarial Accrued Liability (UAAL) (3) - (2)	5. AAL Funded Ratio (2) / (3)	6. Current Payroll [2]	7. UAAL as a % of Payroll (4) / (6)
6/30/2006	$ 2,860,512,434	$ 2,649,525,233	$ (210,987,201)	108.0%	$ 557,644,472	(37.8%)
6/30/2007	3,281,480,077	2,889,294,926	(392,185,151)	113.6%	603,962,838	(64.9%)
6/30/2008	3,352,705,438	3,150,827,023	(201,878,415)	106.4%	644,936,101	(31.3%)
6/30/2009	3,265,597,574	3,332,685,533	67,087,959	98.0%	649,017,701	10.3%
6/30/2010	3,374,437,839	3,639,669,273	265,231,434	92.7%	675,797,434	39.2%
6/30/2011	3,593,786,865	3,638,956,279	45,169,414	98.8%	687,342,353	6.6%
6/30/2012	3,786,594,692	4,122,436,112	335,841,420	91.9%	697,111,339	48.2%
6/30/2013	4,180,703,618	4,392,946,977	212,243,359	95.2%	706,603,233	30.0%

F. Schedule of Employer Contributions [1]

1. Year Ending	2. Annual Required Contribution (ARC) [3]	3. Actual Employer Contribution	4. % of ARC (3) / (2)
6/30/2006	$ 102,964,243	$ 143,271,720	139.1%
6/30/2007	108,741,000	122,711,636	112.8%
6/30/2008	117,772,753	133,195,793	113.1%
6/30/2009	62,881,270	64,285,337	102.2%
6/30/2010	126,558,452	130,774,507	103.3%
6/30/2011	133,903,337	133,726,466	99.9%
6/30/2012	141,987,798	135,605,408	95.5%
6/30/2013	88,287,288	137,110,691	155.3%

[1] Valuation results prior to June 30, 2010 were calculated by the prior actuary.

[2] For the ABC Fund, payroll is the applicable first class officer pay for each member.

[3] For the year ending June 30, 2012, the ARC amount shown is based on the ARC Rate developed in the actuarial valuation completed one year prior to the beginning of the fiscal year multiplied by projected payroll for the fiscal year. Starting with the year ending June 30, 2013, the ARC amount is based on the ARC Rate developed in the actuarial valuation completed one year prior to the beginning of the fiscal year multiplied by actual payroll during the fiscal year.

REQUIRED SUPPLEMENTARY INFORMATION UNDER GASB #25 AND #27 (CONTINUED)

G. Development of Net Pension Obligation (NPO)

1. Year Ending	2. Annual Required Contribution (ARC)	3. Interest on NPO at Discount Rate	4. ARC Adjustment (9) / (5)	5. Amortization Factor	6. Net Pension Cost (NPC) (2) + (3) - (4)	7. Actual Employer Contribution	8. Change in NPO (6) - (7)	9. NPO at Beginning of Year	10. NPO at End of Year (8) + (9)
6/30/2011	$ 133,903,337	$ (5,306,825)	$ (6,109,419)	12.4090	$ 134,705,931	$ 133,726,466	$ 979,465	$ (75,811,784)	$ (74,832,319)
6/30/2012	141,987,798	(5,238,262)	(6,030,487)	12.4090	142,780,023	135,605,408	7,174,615	(74,832,319)	(67,657,704)
6/30/2013	88,287,288	(4,566,895)	(5,315,993)	12.7272	89,036,386	137,110,691	(48,074,305)	(67,657,704)	(115,732,009)

H. Three-Year Trend Information

1. Year Ending	2. Net Pension Cost (NPC)	3. Actual Employer Contribution	4. % of NPC (3) / (2)
6/30/2011	$ 134,705,931	$ 133,726,466	99.3%
6/30/2012	142,780,023	135,605,408	95.0%
6/30/2013	89,036,386	137,110,691	154.0%

I. Solvency Test [1]

Portion of Actuarial Liability Provided by Assets
($ in Thousands)

1. As of	2. Member Contribution Balances	3. Retired and Beneficiaries	4. Non-Retired Members (Employer Financed Portion)	5. Total Actuarial Accrued Liabilities	6. Actuarial Value of Assets
6/30/2006	$ 455,476,000	$ 546,627,672	$ 1,647,421,561	$ 2,649,525,233	$ 2,860,512,434
	100.0%	100.0%	100.0%	108.0%	
6/30/2007	498,662,000	655,826,901	1,734,806,025	2,889,294,926	3,281,480,077
	100.0%	100.0%	100.0%	113.6%	
6/30/2008	534,303,000	765,909,426	1,850,614,597	3,150,827,023	3,352,705,438
	100.0%	100.0%	100.0%	106.4%	
6/30/2009	571,534,000	793,166,894	1,967,984,639	3,332,685,533	3,265,597,574
	100.0%	100.0%	96.6%	98.0%	
6/30/2010	634,864,721	859,626,595	2,145,177,957	3,639,669,273	3,374,437,839
	100.0%	100.0%	87.6%	92.7%	
6/30/2011	679,848,776	970,676,496	1,988,431,007	3,638,956,279	3,593,786,865
	100.0%	100.0%	97.7%	98.8%	
6/30/2012	728,891,808	1,135,537,898	2,258,006,406	4,122,436,112	3,786,594,692
	100.0%	100.0%	85.1%	91.9%	
6/30/2013	782,124,168	1,288,456,658	2,322,366,151	4,392,946,977	4,180,703,618
	100.0%	100.0%	90.9%	95.2%	

[1] Valuation results prior to June 30, 2010 were calculated by the prior actuary.

CENSUS DATA

A. Reconciliation of Participant Data

	Actives	Inactive Non-Vested With Member Contribution Balance	Inactive Vested	Disabled	Retired	Beneficiary	Total
Total as of June 30, 2012	13,390	751	122	690	1,927	591	17,471
New Entrants	413	24	-	-	-	-	437
Rehires	18	(18)	-	-	-	-	-
Non-Vested Terminations	(108)	108	-	-	-	-	-
Vested Terminations	(38)	-	38	-	-	-	-
Retirements	(251)	-	(30)	(6)	287	-	-
Disablements	(32)	-	-	34	(2)	-	-
Death with Beneficiary	(8)	-	(1)	(11)	(27)	47	-
Death without Beneficiary	(13)	-	-	(1)	(22)	(20)	(56)
Refunds	(84)	(58)	-	-	-	-	(142)
Data Adjustments	-	(11)	-	1	-	3	(7)
Total as of June 30, 2013	13,287	796	129	707	2,163	621	17,703

B. Census Information as of June 30, 2013

		Male	Female	Total
1.	Active			
	a. Number	12,554	733	13,287
	b. Average Age	41.9	41.5	41.9
	c. Average Years of Service	14.4	14.2	14.4
	d. Covered Payroll of Actives [1]	$ 665,713,167	$ 40,890,066	$ 706,603,233
2.	Inactive - Vested			
	a. Number	122	7	129
	b Average Age	50.0	48.5	49.9
	c. Average Years of Service	22.6	22.0	22.6
3.	Inactive - Non-Vested [2]			
	a. Number	697	99	796
4.	Retiree/Beneficiary/Disabled			
	a. Number	2,710	781	3,491
	b. Average Age	61.6	62.2	61.7
	c. Annual Benefits Payable	$ 72,875,374	$ 14,425,898	$ 87,301,272

[1] For the ABC Fund, payroll is the applicable first class officer pay for each member.

[2] For June 30, 2013, inactive non-vested members entitled to a refund of their member contributions totaling $6,733,809.

C. Schedule of Active Member Valuation Data [1]

1. As of	2. Active Members	3. Anticipated Payroll ($ in Thousands)[2]	4. Average Pay [2] (3) / (2)	5. Annual Percent Change
6/30/2004	11,424	$ 493,707	$ 43,217	3.4%
6/30/2005	11,728	522,227	44,528	3.0%
6/30/2006	12,056	557,644	46,254	3.9%
6/30/2007	12,611	603,963	47,892	3.5%
6/30/2008	13,095	644,936	49,251	2.8%
6/30/2009	13,184	649,018	49,228	(0.0%)
6/30/2010	13,362	675,797	50,576	2.7%
6/30/2011	13,376	687,342	51,386	1.6%
6/30/2012	13,390	697,111	52,062	1.3%
6/30/2013	13,287	706,603	53,180	2.1%

[1] Valuation results prior to June 30, 2010 were calculated by the prior actuary.

[2] For the ABC Fund, payroll is the applicable first class officer pay for each member.

D. Schedule of Retirees, Beneficiaries, and Disabled Members [1]

1.	2.	3.	4.	5.	6.	7.	8.	9.
	Added		Removed		End of Year [2]			
Year Ending	Number	Annual Allowances ($ in Thousands)	Number	Annual Allowances ($ in Thousands)	Number	Annual Allowances ($ in Thousands)	% Change in Annual Allowances	Average Annual Allowances
6/30/2004	14	$ 255	22	$ 387	1,898	$ 33,706	(1.5%)	$ 17,759
6/30/2005	257	5,493	28	554	2,127	38,648	14.7%	18,170
6/30/2006	172	3,860	34	592	2,265	41,973	8.6%	18,531
6/30/2007	333	8,101	50	886	2,548	49,537	18.0%	19,442
6/30/2008	255	5,861	273	4,565	2,530	53,588	8.2%	21,181
6/30/2009	102	2,571	24	479	2,608	55,564	3.7%	21,305
6/30/2010	208	4,918	34	641	2,782	60,220	8.4%	21,646
6/30/2011	218	6,179	34	609	2,966	68,179	13.2%	22,987
6/30/2012	281	7,900	39	814	3,208	76,917	12.8%	23,977
6/30/2013	326	10,098	43	845	3,491	87,301	13.5%	25,008

[1] Valuation results prior to June 30, 2010 were calculated by the prior actuary.

[2] End of year annual allowances are not equal to the prior end of year annual allowances plus additions and less removals because of reductions for beneficiary benefits, data changes, and cost-of-living increases.

E. Distribution of Active Members by Age and Service

Attained Age	Distribution of Active Members by Age and Service as of June 30, 2013										
	Under 1 year	1 to 4 years	5 to 9 years	10 to 14 years	15 to 19 years	20 to 24 years	25 to 29 years	30 to 34 years	35 to 39 years	Over 40 years	Total
<25	71	45									116
25-29	182	609	249								1,040
30-34	98	484	1,055	184							1,821
35-39	28	264	922	1,040	175						2,429
40-44		33	478	1,010	1,152	129					2,802
45-49	1	3	39	441	785	810	165				2,244
50-54		2	10	39	307	614	644	92			1,708
55-59		1	4	6	63	187	301	277	29		868
60-64			1	6	15	9	91	93	22		237
65-69					3	1	1	15	1		21
70&Above					1						1
Total	380	1,441	2,758	2,726	2,501	1,750	1,202	477	52		13,287

F. Distribution of Inactive Vested Members by Age and Service

Attained Age	Distribution of Inactive Vested Members by Age and Service as of June 30, 2013				
	Under 20 years	20 to 24 years	25 to 29 years	Over 30 years	Total
<25					
25-29					
30-34					
35-39					
40-44		11			11
45-49		63	1		64
50-54		34	5	2	41
55-59		1	2	4	7
60-64		1		3	4
65-69		1	1		2
70&Above					
Total		111	9	9	129

G. Distribution of Retired Members, Beneficiaries, and Disabled Members by Age and Number of Years Retired

Attained Age	Distribution of Retired Members, Beneficiaries, and Disabled Members by Age and Number of Years Retired as of June 30, 2013							
	Under 5 years	5 to 9 years	10 to 14 years	15 to 19 years	20 to 24 years	25 to 29 years	Over 30 years	Total
<40	44	22	21	10	9	1	1	108
40-44	33	23	19	2	3			80
45-49	30	48	27	10	4	2		121
50-54	266	48	31	30	13	8	3	399
55-59	564	265	57	46	20	16	3	971
60-64	172	271	127	59	28	23	7	687
65-69	33	52	164	66	52	25	12	404
70-74	2	4	4	237	36	24	10	317
75-79		1	2	63	105	22	11	204
80-84			1	23	34	36	5	99
85-89			1	5	18	35	19	78
90&Above				1	5	8	9	23
Total	1,144	734	454	552	327	200	80	3,491

H. Schedule of Benefit Recipient by Type of Benefit Option

Number of Benefit Recipients by Benefit Option as of June 30, 2013

Amount of Monthly Benefit	Retiree Single Life Annuity	Retiree 60% Joint and Survivor Annuity	Survivors	Disability	Total
$ 1 - 500	0	0	13	0	13
501 - 1,000	0	10	138	30	178
1,001 - 1,500	24	120	312	102	558
1,501 - 2,000	77	398	101	230	806
2,001 - 3,000	211	1,064	48	317	1,640
over 3,000	41	218	9	28	296
Total	353	1,810	621	707	3,491

I. Schedule of Average Benefit Payments as of June 30, 2013 [1]

	Years of Credited Service							
	0-4	5-9	10-14	15-19	20-24	25-29	30+	Total
Average Monthly Defined Benefit	$ 1,877	$ 1,817	$ 1,748	$ 1,734	$ 1,864	$ 2,362	$ 2,553	$ 2,084
Average Final Average Salary	$ 43,776	$ 41,483	$ 45,969	$ 44,636	$ 43,120	$ 46,421	$ 48,656	$ 45,245
Number of Benefit Recipients	117	173	226	273	1,243	883	576	3,491

[1] For some members average salary at retirement and years of credited service was not available. The average salary for each group excludes these members.

ACTUARIAL ASSUMPTIONS AND METHODS

A. Actuarial Assumptions

The assumptions used in the valuation were selected and approved by the ABC Board of Trustees. The demographic assumptions are reviewed every five years through a study of actual experience. In this way, the actuary provides guidance to the Board in selecting the assumptions. The actuary and other economic and investment professionals also provide advice to the Board for selecting the economic assumptions. In our opinion, the assumptions are reasonable for purposes of this valuation.

Interest Rate / Investment Return	6.75% (net of administrative and investment expenses)
Interest on Member Balances	3.5% per year
Future Salary Increases	3.25% per year
Inflation	3.0% per year
Cost of Living Increases	2.25% per year in retirement
Mortality (Healthy and Disabled)	2013 IRS Static Mortality projected five (5) years with Scale AA
Disability	Based on 2005-2010 experience. Illustrative rates shown below:

Age	Rate
20	0.000%
25	0.075%
30	0.150%
35	0.200%
40	0.400%
45+	0.700%

A. Actuarial Assumptions (continued)

Termination

Based on 2005-2010 experience. Illustrative rates shown below:

Service	Rate	Service	Rate
0	40.0%	7-9	2.0%
1	20.0%	10-14	1.5%
2	5.0%	15-19	1.0%
3	4.0%	20+	1.5%
4	3.5%		
5	3.0%		
6	2.5%		

Retirement

Based on 2005-2010 experience. Illustrative rates shown below:

Ages	Service <32	Service >=32
45-51	10.0%	100.0%
52-57	10.0%	20.0%
58-61	15.0%	20.0%
62-64	20.0%	20.0%
65-69	50.0%	50.0%
70+	100.0%	100.0%

Decrement Timing

Decrements are assumed to occur at the beginning of the year.

Active Members in DROP

Members who are participating in the DROP are assumed to receive an annuity benefit commencing at the end of their DROP period as well as a lump sum payment equal to the number of years they were in the DROP times their annual annuity benefit. The annuity benefit is estimated based on salary and service at the time the member entered the DROP.

Spouse/Beneficiary

80% of male members and 50% of female members are assumed to be married or to have a dependent beneficiary. Male members are assumed to be three (3) years older than females and female members are assumed to be the same age as males.

Disability Retirement

For members hired after 1989 that become disabled, impairments are assumed to be 45% Class 1 (at 65% of salary), 10% Class 2 (at 50% of salary), and 45% Class 3 (at 36% of salary).

A. Actuarial Assumptions (continued)

Pre-Retirement Death	Of active member deaths, 10% are assumed to be in the line of duty and 90% are other than in the line of duty. Additionally, all deaths among retired and disabled members are other than in line of duty.
Data Assumptions	Actives and inactives with either no date of birth and/or no gender are assumed to be age 41 and/or male. Spouse gender is assumed to be the opposite gender of the member. Retirees and disabled members that are not married and do not have a retirement option listed are assumed to elect a single life annuity. Retirees and disabled members that are married and do not have a retirement option listed are assumed to be receiving a 60% joint and survivor annuity. Beneficiaries that do not have a retirement option listed are assumed to receive monthly payments for life.
Changes in Assumptions	For the June 30, 2013 valuation, the Board approved the following assumption changes: - The interest crediting rate assumption on member contribution balances was lowered from 5.5% to 3.5%.

B. Actuarial Methods

The actuarial methods used in this valuation were selected and approved by the Board. In general, the methods provide orderly funding of all benefits being accrued, as well as unfunded past-service benefit liabilities, over a period of thirty years. However, the smoothing methods employed in determining the Actuarial Value of Assets may accelerate or lengthen the effective funding period, depending on whether gains or losses are experienced. In our opinion, the actuarial methods are reasonable for the purposes of this valuation.

1. Actuarial Cost Method

   The actuarial cost method is Entry Age Normal - Level Percent of Payroll.

   The normal cost is calculated separately for each active member and is equal to the level percentage of payroll needed as an annual contribution from entry age to retirement age to fund projected benefits. The actuarial accrued liability on any valuation date is the accumulated value of such normal costs from entry age to the valuation date.

   Gains and losses occurring from census experience different than assumed, assumption changes, and benefit changes are amortized over a 30-year period with level payments each year. A new gain or loss base is established each year based on the additional gain or loss during that year and that base is amortized over a new 30-year period. The purpose of the method is to give a smooth progression of the costs from year to year and, at the same time, provide for an orderly funding of the unfunded liabilities.

2. Asset Valuation Method

   Actuarial Value of Assets is equal to a four-year smoothing of gains and losses on the Market Value of Assets subject to a 20% corridor.

3. Employer Contribution Rate

   Based on the assumptions and methods previously described, an Actuarially Calculated Rate is computed. The Board considers this information, but has ultimate authority in setting the employer contribution rate.

4. Anticipated Payroll

   The Anticipated Payroll of $706,603,233 for the fiscal year beginning July 1, 2013 is equal to the 1st class officer salary in effect at July 1, 2013, but does not include amounts for members who have reached the age at which retirement is assumed to occur immediately.

5. Changes in Actuarial Methods

   There have been no changes in the actuarial methods since the June 30, 2012 valuation.

SUMMARY OF PLAN PROVISIONS

Summary of Plan Provisions

The benefit provisions for the ABC Fund are set forth in statute. A summary of those defined pension benefit provisions is presented below:

Participation		All full-time, fully-paid police officers and firefighters who work for employers participating in the ABC Fund and who are hired or rehired after April 30, 1977.
Eligibility for Defined Pension Benefits		
a.	Normal Retirement	Age 52 with 20 or more years of creditable service
b.	Early Retirement	Age 50 with 20 or more years of creditable service
c.	Late Retirement	Subject to continued employment after normal retirement
d.	Disability Retirement	As determined by a disability medical panel.
e.	Termination	20 or more years of creditable service and no longer active (i.e. vested inactive)
f.	Pre-Retirement Death	Immediate
Amount of Benefits		
a.	Normal Retirement	The retirement benefit valued was 50% of the base salary (first-class salary) of a First Class Police Officer and Firefighter with 20 years of service, plus an additional 1% for each completed 6 months of service over 20 years up to a maximum of 74% with 32 years of service.
b.	Early Retirement	Early retirement benefits are reduced by 7% per year for commencement between ages 50 and 52.
c.	Late Retirement	The late retirement benefit is calculated in the same manner as the normal retirement benefit. Creditable service and earnings earned after normal retirement is included in the computation.

Summary of Plan Provisions (continued)

Amount of Benefits (continued)

d. Disability Retirement

Hired Before 1990 This disability benefit is only available to members hired prior to January 1, 1990 and who do not choose to be covered by the disability benefit for members hired after 1989. The disability benefit is equal to the benefit the member would have received if the member had retired. If the member does not have 20 years of service or is not at least age 52 on the date of disability, the benefit is computed as if the member does have 20 years of service and is age 52 on the date of disability.

Hired after 1989 This disability benefit is for members hired after 1989, or hired prior to January 1, 1990, who have chosen to be covered by this disability benefit. The following describes the three different classes of impairments and the amount of base benefit for each class:

Class 1 Impairment:
A personal injury that occurs while on duty, while responding to an emergency, or due to an occupational disease. The disability benefit is equal to a base benefit of 45% of base salary, plus an additional amount between 10% and 45% of this salary based on degree of impairment. The benefit is payable for life, at which time the member is entitled to a retirement benefit based on the salary and service the member would have earned had the member remained in active service.

Class 2 Impairment:
A proven duty-related disease. The disability benefit is equal to a base benefit of 22% of base salary, plus an additional 0.5% of this salary for each year of service up to a maximum of 30 years of service, plus an additional amount between 10% and 45% of this salary based on degree of impairment. If the member's total benefit is less than 30% of this salary and the member has fewer than 4 years of service, then the benefit is payable for a period equal to the years of service of the member. Otherwise, the benefit is payable for life.

Summary of Plan Provisions (continued)

Amount of Benefits (continued)

d. Disability Retirement (continued)

Hired after 1989 (continued)

Class 3 Impairment:
All other impairments that are not Class 1 or Class 2. The disability benefit is equal to a base benefit of 1% of base salary for each year of service up to a maximum of 30 years of service, plus an additional amount between 10% and 45% of this salary based on degree of impairment. If the member's total benefit is less than 30% of this salary and the member has fewer than 4 years of service, then the benefit is payable for a period equal to the years of service of the member. Otherwise, the benefit is payable until age 52, at which time the member is entitled to a retirement benefit based on 20 years of service.

e. Termination

If a member ends employment other than by death or disability before completing 20 years of active service, the member shall be entitled to the member's contributions plus accumulated interest. This benefit is not available to converted members.

If termination is after earning 20 years of service, the termination benefit is the accrued retirement benefit determined as of the termination date and payable commencing of the normal retirement date. The member may elect to receive a reduced early retirement benefit.

f. Pre-Retirement Death

Surviving Spouse

If a member dies other than in the line of duty, the spouse's benefit is equal to 60% of the monthly benefit the member was receiving or was entitled to receive on the date of death.

If a member dies in the line of duty, the spouse's benefit is equal to the monthly benefit the member was receiving or was entitled to receive on the date of death.

In either case, if the member does not have 20 years of service or is not at least age 52 on the date of death, the benefit is computed as if the member does have 20 years of service and is age 52 on the date of death.

Summary of Plan Provisions (continued)

Amount of Benefits (continued)

f. Pre-Retirement Death (continued)

Children	A payment shall be made to each child of a deceased member equal to 20% of the member's benefit until the later of (a) the date the child becomes age 18, or (b) the date the child becomes age 23 if enrolled in a qualified school. If a child is at least 18 and is mentally or physically incapacitated, the child is entitled to an amount equal to the greater of 30% of the base salary, or 55% of the member's benefit payable for the duration of the incapacity. If the member does not have 20 years of service or is not at least age 52 on the date of death, the benefit is computed as if the member does have 20 years of service and is age 52 on the date of death.
Dependent Parents	If a deceased member leaves no surviving spouse and no qualified child but does leave a dependent parent or parents, an amount equal to 50% of the member's benefit shall be paid to the parent or parents jointly during their lifetime. If the member does not have 20 years of service or is not at least age 52 on the date of death, the benefit is computed as if the member does have 20 years of service and is age 52 on the date of death.
No Spouse or Dependent	If a deceased member leaves no surviving spouse, no qualified dependent child, nor a dependent parent, a refund of the member's contributions plus accumulated interest will be made to the member's estate.

g. Additional Death Benefits — A funeral death benefit is paid to the heirs or estate upon the member's death from any cause and is equal to at least $12,000. An additional death benefit of $150,000 is paid from the Pension Relief Fund to a surviving spouse, children, or parent(s) if death occurs in the line of duty.

Member Contributions — Members are assumed to contribute at the rate of 6% of salary until they have completed 32 years of service.

Summary of Plan Provisions (continued)

Withdrawal from Fund	If a member's employment is terminated prior to eligibility for a retirement annuity, the member may withdraw their contributions form the Fund.
Deferred Retirement Option Plan ("DROP")	The DROP is an optional form of benefit, which allows members who are eligible for an unreduced retirement benefit to continue to work and earn a salary while accumulating a DROP benefit payable in a lump sum or three annual installments. A member who elects to enter the DROP shall execute an irrevocable election to retire on the DROP retirement date. The member shall select a DROP retirement date not less than 12 months and not more than 36 months after the member's DROP entry date. While in the DROP, the member shall continue to make applicable fund contributions. When a member enters the DROP, a "DROP frozen benefit" will be calculated. This is equal to the member's monthly retirement benefit based on accrued service and base salary as of the date member enters the DROP. Upon DROP retirement, the member is eligible to receive a lump sum equal to the amount of the DROP frozen benefit multiplied by the number of months in the DROP. You may elect to receive this amount in three annual installments instead of in a single lump sum. In addition, the member will receive a monthly retirement benefit equal to the DROP frozen benefit. The member will not continue to accrue service credit for the years in the DROP. Cost of living adjustments will not apply to the frozen monthly benefit while in the DROP. The cost of living adjustments will begin to be applied to the frozen monthly benefit, however, in the year after the year in which the member retires. If the member elected to participate in the DROP, the member may, upon retirement, elect to forego DROP benefits, and instead receive monthly retirement benefits calculated as if the member never elected to participate in the DROP. These benefits would be based on accrued service and base salary as of the date the member retires.

Summary of Plan Provisions (continued)

Forms of Payment	
a. Single Life Annuity	Member will receive a monthly benefit for life, but there are no monthly payments to anyone after death.
b. Joint with 60% Survivor Benefits	Member will be paid a monthly benefit for life. After death, 60% of the benefit will be paid to the spouse or parent for their lifetime or the dependent until age 18.
Cost-of-Living Adjustments	Benefits for retired members are increased annually based on increases in the CPI-U index. The increase is subject to a 3% maximum and 0% minimum.
Changes in Provisions	No changes since prior valuation.

DEFINITIONS OF TECHNICAL TERMS

Definitions of Technical Terms

Actual Rate	For valuations prior to June 30, 2011, the contribution rate expressed as a percentage of covered payroll on an annual basis (not less than 0.0%) that is the result of applying applicable smoothing rules to the prior year Actual Rate and current year Actuarially Calculated Rate. Beginning with the June 30, 2011 valuation, the Board resolved to discontinue use of the smoothing rules for establishing contribution rates.
Actuarial Accrued Liability (AAL)	That portion, as determined by a particular Actuarial Cost Method, of the Present Value of Future Benefits (PVFB) and expenses which is not provided for by future Normal Costs. Generally this means the portion of the PVFB attributable to past service.
Actuarial Assumptions	Assumptions as to the occurrence of future events affecting pension costs, such as: mortality, withdrawal, disablement and retirement; changes in compensation and Government provided pension benefits; rates of investment earnings and asset appreciation or depreciation; procedures used to determine the Actuarial Value of Assets; characteristics of future entrants for Open Group Actuarial Cost Methods; and other relevant items.
Actuarial Cost Method	A procedure for determining an actuarially equivalent allocation of the Present Value of Future Benefits to time periods, usually in the form of a Normal Cost and an Actuarial Accrued Liability.
Actuarially Equivalent	A method of making the actuarial present value of two series of payments equal as of a given date using the same assumptions.
Actuarial Gain/(Loss)	The difference between actual unfunded Actuarial Accrued Liability and anticipated unfunded Actuarial Accrued Liability — during the period between two valuation dates. It is a measurement of the difference between actual and expected experience.
Actuarial Present Value	The single amount now that is equal to a payment or series of payments in the future. It is determined by discounting future payments at predetermined rates of interest and by probabilities of payment.
Actuarial Valuation	The determination, as of a valuation date, of the Normal Cost, Actuarial Accrued Liability, Actuarial Value of Assets, and related Actuarial Present Values for a pension plan.

Definitions of Technical Terms (continued)

Actuarial Valuation Date	The date as of which an actuarial valuation is performed.
Actuarially Calculated Rate	The precise actuarial contribution rate expressed as a percentage of covered payroll that is determined by summing the Normal Cost and amortization of unfunded Actuarial Accrued Liability and dividing by anticipated payroll.
Amortization	The payment of a present value financial obligation on an installment basis over a future number of years.
Annual Required Contribution of the Employer (ARC)	The employer's periodic required contributions to a defined benefit pension plan, calculated in accordance with the plan provisions, actuarial assumptions, actuarial cost method and other actuarial method prescribed by Governmental Accounting Standards No. 25 and No. 27.
Creditable Service	Service credited under the system that was rendered before the date of the actuarial valuation.
Funding Policy	The program for the amounts and timing of contributions to be made by plan members, employer, and other contributing entities (for example, state government contributions to a local government plan) to provide the benefits specified by a pension plan.
Level Dollar Amortization Method	The amount to be amortized is divided into equal dollar amounts to be paid over a given number of years; part of each payment is interest and part is principal (similar to a mortgage payment on a building). Because payroll can be expected to increase as a result of inflation, level dollar payments generally represent a decreasing percentage of payroll; in dollars adjusted for inflation, the payments can be expected to decrease over time.
Normal Cost (NC)	That portion of the present value of future benefits which is allocated to a valuation year by the Actuarial Cost Method. The normal cost is specific to the cost method used.
Plan Assets	Resources, usually in the form of stocks, bonds, and other classes of investments, that have been segregated and restricted in a trust, or equivalent arrangement, in which (a) employer contributions to the plan are irrevocable, (b) assets are dedicated to providing benefits to retirees and their beneficiaries, and (c) assets are legally protected from creditors of the employer(s) or plan administrator, for the payment of benefits in accordance with the terms of the plan.

Definitions of Technical Terms (continued)

Plan Members	The individuals covered by the terms of a pension plan. The plan membership generally includes employees in active service, terminated employees who have accumulated benefits but are not yet receiving them, and retired employees and beneficiaries currently receiving benefits.
Present Value of Future Benefits (PVFB)	Projected benefits estimated to be payable to plan members (retirees and beneficiaries, terminated employees entitled to benefits but not yet receiving them, and current active members upon retirement) as a result of their service through the valuation date and their expected future service. The actuarial present value of projected future benefits as of the valuation date is the present value of the cost to finance benefits payable in the future, discounted to reflect the expected effects of the time value (present value) of money and the probabilities of payment (taking into account mortality, turnover, probability of participating in plan retirement, etc.). Alternatively, it is the amount that would have to be invested on the valuation date so that the amount invested plus investment earnings will provide sufficient assets to pay the projected benefits when due.

Appendix B – Sample Experience Study Report

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ABC Retirement System

ABC Plan Experience Study

Month Date, Year

pwc

ABC Experience Study

Executive Summary

Executive Summary

- As required by statute, an experience study is performed every five years for ABC Retirement System to review the assumptions used in the annual actuarial valuation.
- Census data for the past five years (2005 – 2010) was collected and analyzed. In some cases more than five years of data was collected and considered and/or experience was weighted to give greater or lesser consideration to recent experience.
- Demographic assumptions:
  - Past experience tends to be a good indicator of future demographic experience.
  - Most recommended changes to the demographics assumptions would have a small impact on the total liability of the system and the calculation of the contribution rate.
    - The mortality assumption is the one exception. The current assumption appears to be too conservative, based on the experience.
- Economic assumptions:
  - Expert forecasts and observable expectations of future economic activity are more heavily relied upon for setting economic assumptions than past experience.
  - Recommended changes to the economic assumptions would have a larger impact on the system, though most of the changes produce a favorable result (i.e. lower liabilities and contribution rates)
  - Economic expectations have changed significantly since the prior experience study.

Executive Summary

- Economic assumptions (Cont.):
  - Inflation is a component of all economic assumptions, so a decrease in the inflation assumption results in a decrease to other economic assumptions, such as payroll growth, individual salary growth, cost-of-living adjustments, etc.
  - The outlook for real wage growth has decreased in recent years.
- Based on the Plan's experience and current market conditions, we recommend changes to most of the current actuarial assumptions.
- Summary of recommended changes:
  - **Mortality**: Change from 1994 GAM table with setbacks and adjustments to the RP 2000 table with additional setbacks, then projected (using Scale AA) to 2016.
  - **Retirement**: Slight changes to reflect less retirement upon first eligibility for the rule-of-80, and greater retirement at 31 years of service through 6/30/2013 and 30 years of service after 6/30/2013.
  - **Disability**: Slight increases in the likelihood of disability retirement at most ages.
  - **Refunds**: Decrease the percentage of vested terminated members who elect a refund of contributions, as opposed to a deferred annuity benefit, from 30% to 12%.
  - **Service Purchases**: Add a 2.00% load to the normal cost each year to anticipate losses generated from service purchases and reinstatements.

Executive Summary

- Summary of Recommended Changes (Cont.):
  - **Dependent Assumptions**:
    - Change the percent married assumptions to assume 80% of all male members and 70% of all female members are married.
    - Change the assumed age difference to assume that members (male or female) are 4 years older than their spouses.
    - Update the assumed value of benefits payable to child beneficiaries upon death to be an age-based table to reflect that older members are likely to have older children.
  - **Inflation**: Reduce the inflation assumption from 3.25% to 2.50%
  - **Payroll Growth**: Reduce the payroll growth assumption from 5.00% to 3.50% (consisting of 2.50% inflation, 0.50% real wage growth, and 0.50% growth due to the inclusion of active health insurance costs in gross salary).
  - **Individual Salary Growth**: Reduce the age-based salary growth assumptions to reflect the reductions in the inflation and real wage growth assumptions, along with slightly lower merit and promotional increases.
  - **Expected Return on Assets**: Wait for the result of the asset/liability study for analysis concerning the expected return assumption.
  - **Cost-of-Living Adjustments**: Lower the COLA assumption from 3.25% to no more than 2.50%.

Executive Summary

- The table below shows the total impact of instituting all of the assumptions recommended in this experience study, including a 2.50% COLA assumption.
  - The impact analysis below is as of 6/30/2010, the date of the last actuarial valuation. A similar impact would be expected at 6/30/2011.
  - The impacts of each individual assumption recommendation shown throughout this report are not additive and therefore will not match the total impact illustrated below if summed.

	Baseline	All Proposed Assumptions	Increase / (Decrease)
Funded Status:			
Actuarial Accrued Liability (AAL)	$ 37,233,602,362	$ 34,566,244,195	$ (2,667,358,167)
Actuarial Value of Assets (AVA)	$ 28,931,330,978	$ 28,931,330,978	$ -
Funded Status ($): AVA - AAL	$ (8,302,271,384)	$ (5,634,913,217)	$ 2,667,358,167
Funded Status (%): AVA / AAL	77.70%	83.70%	6.00%
Market Value of Assets (MVA)	$ 23,755,741,472	$ 23,755,741,472	$ -
Funded Status ($): MVA - AAL	$ (13,477,860,890)	$ (10,810,502,723)	$ 2,667,358,167
Funded Status (%): MVA / AAL	63.80%	68.73%	4.93%
Contribution Rate:			
Normal Cost (mid-year)	$ 987,255,055	$ 881,496,763	$ (105,758,292)
Normal Cost Rate	21.97%	19.62%	(2.35%)
Unfunded Liability Amortization (mid-year)	$ 421,162,139	$ 339,334,843	$ (81,827,296)
Unfunded Liability Amortization Rate	9.37%	7.55%	(1.82%)
Annual Required Contribution	$ 1,408,417,194	$ 1,220,831,607	$ (187,585,587)
Annual Required Contribution Rate	31.34%	27.17%	(4.17%)

Experience Study

- Introduction
- Demographic Assumptions
  - Mortality
  - Retirement
  - Withdrawal
  - Disability
  - Refunds
  - Service Purchases
  - Dependent Assumptions
- Economic Assumptions
  - Inflation
  - Payroll Growth
  - Individual Salary Growth
  - Expected Return on Assets
  - Cost-of-Living Adjustments
- Summary

Introduction

What is an Experience Study?

- A comparison of the demographic and economic experience of a plan with the assumptions used in the actuarial valuation.

What is the purpose of an experience study?

- To ensure that the the actuarial assumptions used in the annual valuations are:
  1. Reflective of the actual demographics and behaviors of the members, to the extent historical experience is measurable and expected to be an indicator of future experience, and
  2. Reflective of current market conditions affecting members and their benefits.

How often is an experience study completed?

- By statute, an experience study must be performed every five years.

Are the assumption recommendations based strictly on past experience?

- No. Past experience is generally combined with expectations about the future for recommending assumptions.
- Past experience tends to be relied upon heavily for setting demographic assumptions (i.e. retirement, withdrawal, disability, death, merit and promotional salary increases, etc.), provided there is enough historical data to be credible.
  - Known aberrations are removed from the data if they do not reflect the actuary's best estimate of future experience.

Introduction

- Future expectations are relied upon heavily for setting economic assumptions (i.e. inflation, asset returns, etc.)
  - Expert opinions and observable market data are considered.

How is the past experience determined?

- Historical data, including status, age, service, and salary, for several years is collected.
  - PwC collected member census data from ABC staff for the past 6 years (i.e. 6/30/2005, 6/30/2006, … , 6/30/2010).
- Past "actual" experience is compared to the "expected" experience based on the current assumptions.
  - The status of each member is tracked throughout the experience period in one-year increments, allowing us to determine the number of expected decrements and actual decrements that occurred during the period.
  - For example, if there were 5,000 members that were age 55 during the experience period ("exposed") and 1,000 of them retired ("decremented"), the retirement experience at age 55 showed 20% likelihood of retirement.
- We also collected current and historical economic data to assist with our review of the economic assumptions.

Introduction

- Keep in mind:
  - Setting assumptions is not an exact science. Data is analyzed for patterns and trends that are likely to continue in the future.
  - Assumptions are meant to be long-term expectations.

Were any modifications made to the data during the study?

- The historical data is reviewed to identify:
  - Bad data, such as errors, missing data, outliers, etc.
  - Significant events that could have caused temporary aberrations in the experience.
- Judgment is used to alter the data or weight the experience to best capture representative experience.
- For the current experience study, the following items were considered:
  - The recession that began in 2008, which has impacted the timing of retirement and certain economic experience.
  - Data for inactive members who are not vested and have not received a refund of their contributions was limited and excluded from the study for most purposes.
  - Data for vested inactive members was excluded from the mortality study because it was often unclear whether members who exited the population were cashed out or deceased.

Introduction

- Given the limited number of disabled retirees, there was limited experience available for developing assumptions. There are publicly available tables/assumptions, based on studies of much larger populations, that can be used in these situations.
- The inclusion of health care costs in the salary that is used for computing pension benefits was considered as part of the study of individual salary increases and total payroll increases.

Demographic Assumptions – Mortality

Description

- The mortality assumption represents the probability of death and is generally an age-based table of rates.
- There are often separate mortality assumptions for:
  - Retirees and beneficiaries versus active and inactive members
  - Healthy members versus disabled members
  - Males versus females
- The mortality assumption for retirees and beneficiaries determines how long such members are expected to live and collect benefits.
- The mortality assumption for active and inactive members determines the likelihood of dying before retirement and receiving pre-retirement death benefits.
- Mortality has been consistently improving (i.e. people are living longer) in the U.S. for generations, though studies show that trend is slowing.
  - Mortality assumptions that include projections of future mortality improvement are very common. This avoids the need to periodically update the assumption, which creates actuarial losses.
  - A generational table could create administrative complexity for ABC staff if internal benefit calculations would need to be updated annually.

Demographic Assumptions – Mortality

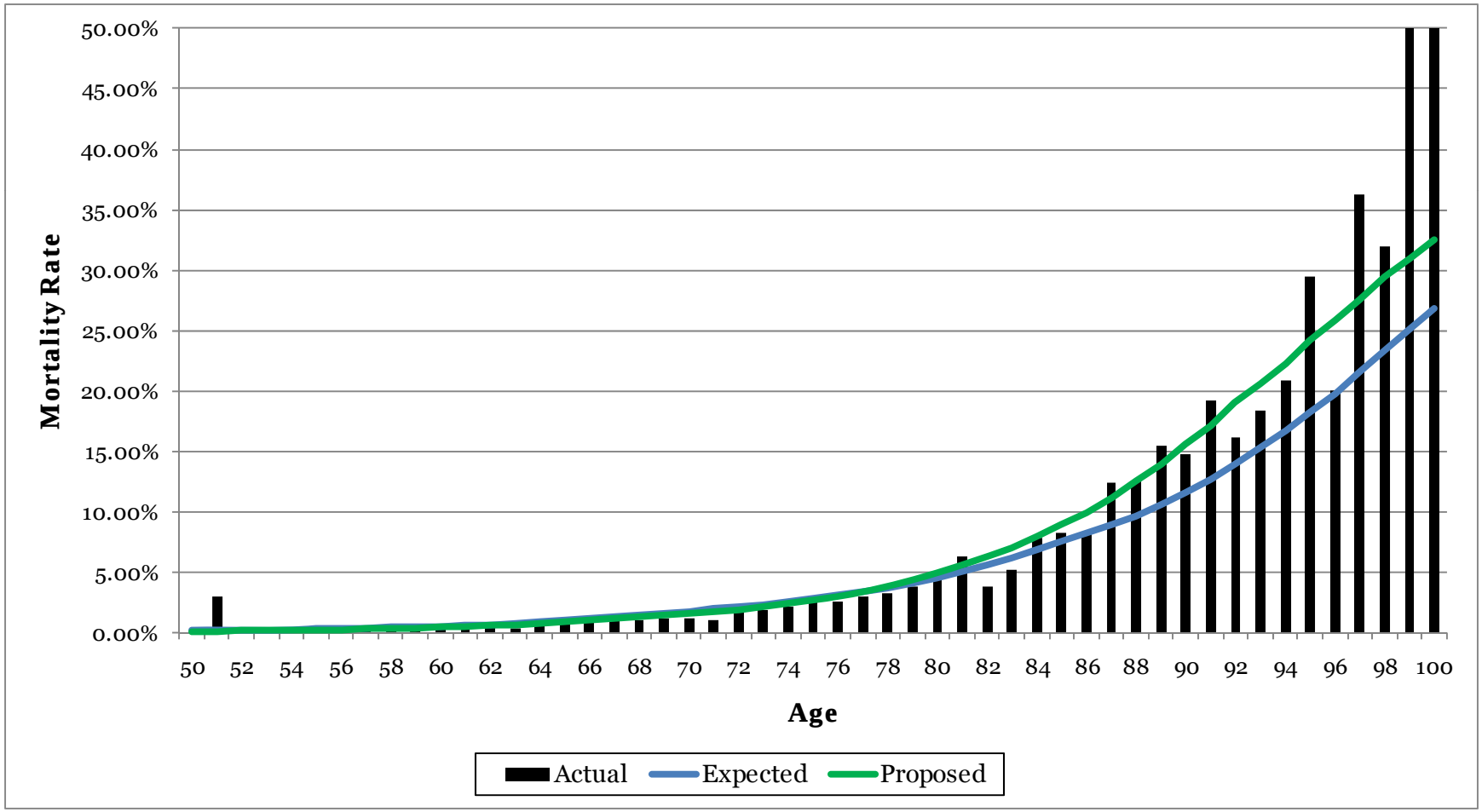
Current Assumption

- Current Plan mortality assumption:
  - Healthy retirees and beneficiaries – The 1994 Group Annuity Mortality Table with ages set back 3 years for both males and females
  - Active and inactive members – The 1994 Group Annuity Mortality Table with ages set back 3 years for both males and females and then multiplied by 70% for males and 65% for females
  - Disabled retirees and beneficiaries – Mortality rates based on prior experience
- The 1994 Group Annuity Mortality Table is an industry standard table that is based on a nationwide experience study of annuitants that was conducted in the mid-1990's.
- Set-backs, set-forwards and multipliers are methods for adjusting a standard table to more closely match experience and/or build in conservatism.
  - A 3-year set back means the assumed rate of mortality for a 60 year old member is assumed to be that of a 57 year old from the 1994 Group Annuity Mortality Table. Multiplying the rate by 70% further reduces the rate of mortality of the 60 year old by 30%.
- The current mortality assumptions were purposefully selected to be conservative, based on the last experience study, to account for future mortality improvements.

Demographic Assumptions – Mortality

Experience and Analysis

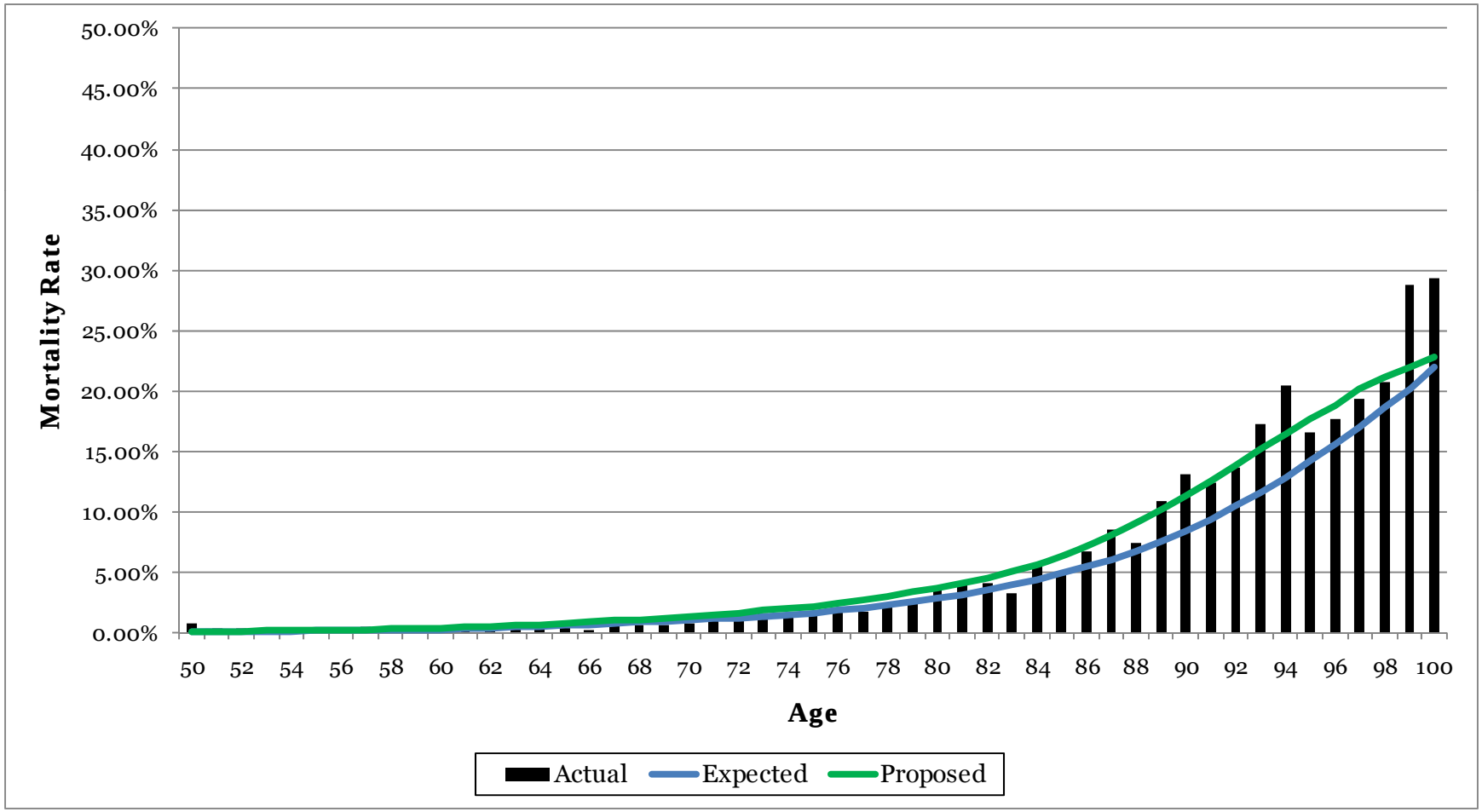
Male retirees - Actual 2005 – 2010 experience weighted 10%, 15%, 20%, 25%, 30%



Demographic Assumptions – Mortality

Experience and Analysis (Cont.)

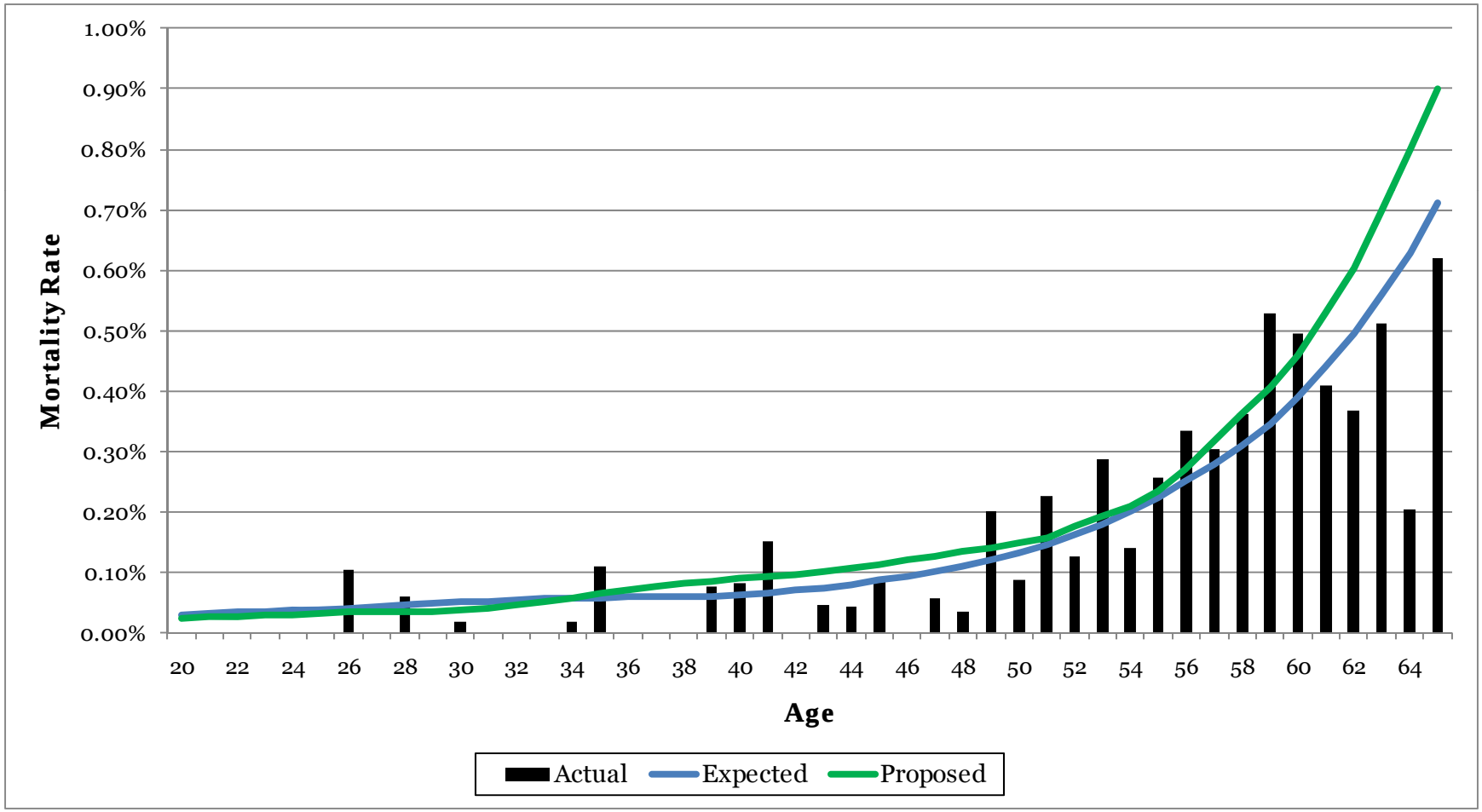
Female retirees - Actual 2005 – 2010 experience weighted 10%, 15%, 20%, 25%, 30%.



Demographic Assumptions – Mortality

Experience and Analysis (Cont.)

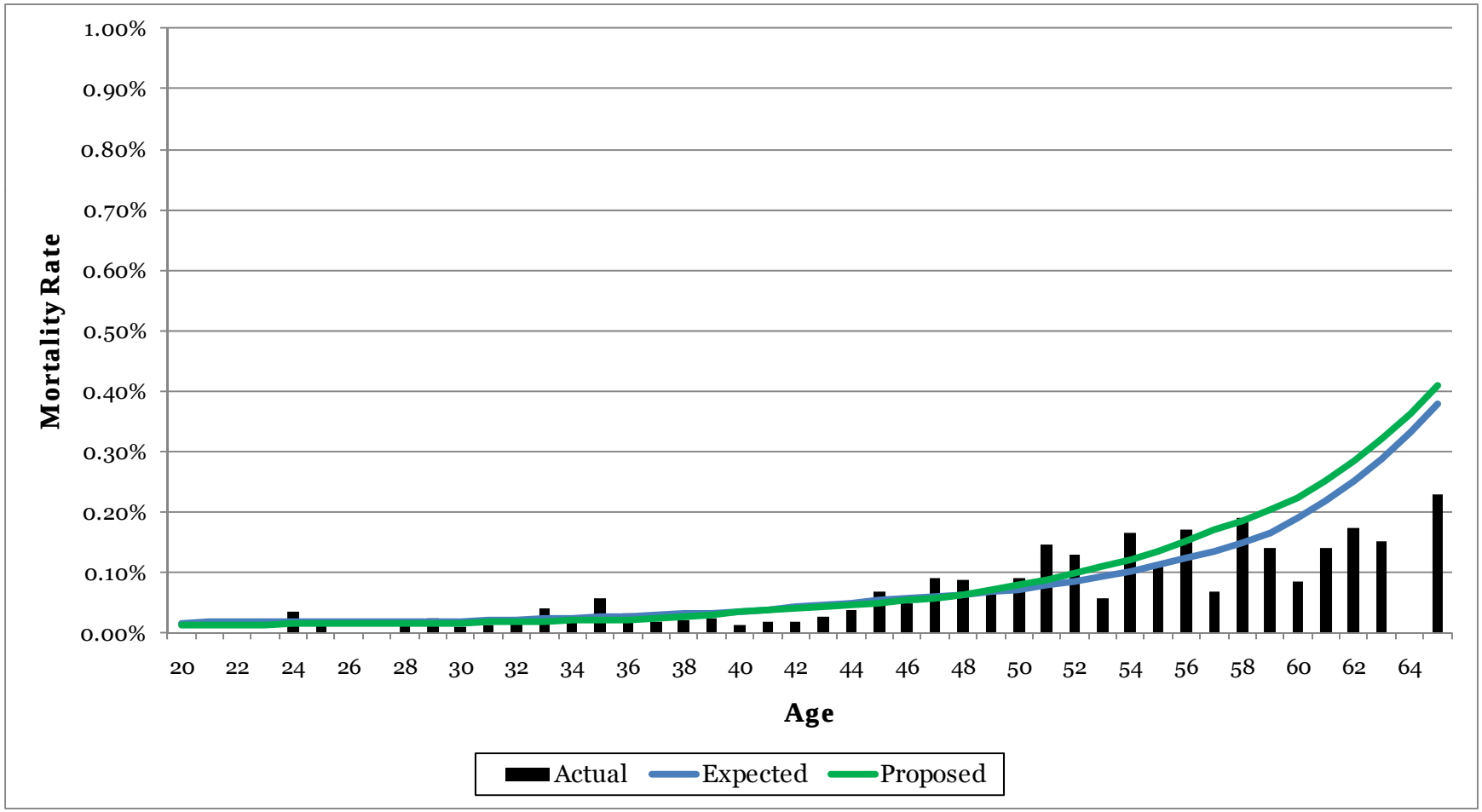
Male actives - Actual 2005 – 2010 experience weighted 10%, 15%, 20%, 25%, 30%.



Demographic Assumptions – Mortality

Experience and Analysis (Cont.)

Female actives - Actual 2005 – 2010 experience weighted 10%, 15%, 20%, 25%, 30%.



Demographic Assumptions – Mortality

Summary

- Based on the experience, the current mortality assumption for retirees and beneficiaries underestimates actual mortality rates, in particular, male retirees and beneficiaries.
- The current mortality assumption for actives and inactives is a fairly good approximation of the experience.
- There is insufficient experience data for disabled retirees to develop a credible assumption.
- A static mortality assumption would allow the internal calculation and administration of the benefits to match the valuation assumptions without the need to update software every year.
- The mortality assumptions should continue to factor future improvements in mortality.

Recommendation

- Healthy retirees and beneficiaries – The RP 2000 Mortality Table with ages set back 1 year for both males and females, then projected to 2016 using Scale AA.
  - This assumption:
    1. Is a static assumption that will not change for the next 5 years.
    2. Includes projected mortality improvement through the date of the next experience study.
    3. Is a closer match to actual experience than the current assumption.
    4. Is based on a more recent study of annuitant mortality than the 1994 GAM table.

Demographic Assumptions – Mortality

Recommendation (Cont.)

- Active and inactive members - The RP 2000 Mortality Table with ages set back 1 year for males and 6 years for females, then projected to 2016 using Scale AA.
  - While the current assumptions are a good approximation of the experience, we recommend updating to the RP 2000 for consistency with the retiree/beneficiary assumption.
  - The additional female set back reflects lower mortality rates for females.
- Disabled retirees – The RP 2000 Disabled Retiree Mortality Table for males and females
  - Given the small amount of disabled mortality data in the experience study, we recommend using a standardized table.

Demographic Assumptions – Mortality

Impact

- The table below shows the impact of revising the mortality assumption.
  - The impact analysis below is as of 6/30/2010, the date of the last actuarial valuation. A similar impact would be expected at 6/30/2011.

		Baseline	Mortality	Increase / (Decrease)
Funded Status:				
	Actuarial Accrued Liability (AAL)	$ 37,233,602,362	$ 36,033,902,926	$ (1,199,699,436)
	Actuarial Value of Assets (AVA)	$ 28,931,330,978	$ 28,931,330,978	$ -
	Funded Status ($): AVA - AAL	$ (8,302,271,384)	$ (7,102,571,948)	$ 1,199,699,436
	Funded Status (%): AVA / AAL	77.70%	80.29%	2.59%
	Market Value of Assets (MVA)	$ 23,755,741,472	$ 23,755,741,472	$ -
	Funded Status ($): MVA - AAL	$ (13,477,860,890)	$ (12,278,161,454)	$ 1,199,699,436
	Funded Status (%): MVA / AAL	63.80%	65.93%	2.13%
Contribution Rate:				
	Normal Cost (mid-year)	$ 987,255,055	$ 961,865,130	$ (25,389,926)
	Normal Cost Rate	21.97%	21.40%	(0.57%)
	Unfunded Liability Amortization (mid-year)	$ 421,162,139	$ 360,411,618	$ (60,750,521)
	Unfunded Liability Amortization Rate	9.37%	8.02%	(1.35%)
	Annual Required Contribution	$ 1,408,417,194	$ 1,322,276,748	$ (86,140,446)
	Annual Required Contribution Rate	31.34%	29.42%	(1.92%)

Demographic Assumptions – Retirement

Description

- The retirement assumption is used to estimate the timing of retirement.
- The eligibility for, and value of, retirement benefits depend on a member's age and service at retirement.
  - Members of the ABC Plan are eligible for unreduced benefits at:
    - Age 60 with 5 years of service,
    - 30 years of service, or
    - 80 points – Any time that age plus service is at least 80.
  - Members are eligible for reduced benefits at age 55 with 5 years of service prior to satisfying any of the criteria above.
  - There is also a temporary retirement benefit available through 6/30/2013 that allows members to retire before age 55 if they have 25 years of service, but are not eligible for the 80 point rule.
  - The retirement formula multiplier is increased for members with 31 or more years of service, but this added benefit is only available through 6/30/2013.
- Retirement assumptions are generally based on age and service to reflect the eligibility requirements for retirement.
- Retirement assumptions are generally not sex distinct since the same retirement incentives apply to both males and females.

Demographic Assumptions – Retirement

Current Assumption

	Service															
	<25		25		26		27		28		29		30		>=31	
Age	Pre-2014	Post-2013	Pre-2014	Post-2013	Pre-2014	Post-2013	Pre-2014	Post-2013	Pre-2014	Post-2013	Pre-2014	Post-2013	Pre-2014	Post-2013	Pre-2014	Post-2013
45	0.0%	0.0%	4.0%	0.0%	4.0%	0.0%	4.0%	0.0%	4.0%	0.0%	4.0%	0.0%	35.0%	35.0%	30.0%	30.0%
46	0.0%	0.0%	4.0%	0.0%	4.0%	0.0%	4.0%	0.0%	4.0%	0.0%	4.0%	0.0%	35.0%	35.0%	30.0%	30.0%
47	0.0%	0.0%	4.0%	0.0%	4.0%	0.0%	4.0%	0.0%	4.0%	0.0%	4.0%	0.0%	35.0%	35.0%	30.0%	30.0%
48	0.0%	0.0%	4.0%	0.0%	4.0%	0.0%	4.0%	0.0%	4.0%	0.0%	4.0%	0.0%	35.0%	35.0%	30.0%	30.0%
49	0.0%	0.0%	4.0%	0.0%	4.0%	0.0%	4.0%	0.0%	4.0%	0.0%	4.0%	0.0%	35.0%	35.0%	30.0%	30.0%
50	0.0%	0.0%	4.0%	0.0%	4.0%	0.0%	4.0%	0.0%	4.0%	0.0%	4.0%	0.0%	49.0%	49.0%	30.0%	30.0%
51	0.0%	0.0%	4.0%	0.0%	4.0%	0.0%	4.0%	0.0%	4.0%	0.0%	49.0%	49.0%	35.0%	35.0%	30.0%	30.0%
52	0.0%	0.0%	4.0%	0.0%	4.0%	0.0%	4.0%	0.0%	49.0%	49.0%	24.0%	24.0%	35.0%	35.0%	30.0%	30.0%
53	0.0%	0.0%	4.0%	0.0%	4.0%	0.0%	49.0%	49.0%	24.0%	24.0%	24.0%	24.0%	35.0%	35.0%	30.0%	30.0%
54	0.0%	0.0%	4.0%	0.0%	49.0%	49.0%	24.0%	24.0%	24.0%	24.0%	24.0%	24.0%	35.0%	35.0%	30.0%	30.0%
55	2.5%	2.5%	45.0%	45.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	35.0%	35.0%	30.0%	30.0%
56	45.0%	45.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	35.0%	35.0%	30.0%	30.0%
57	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	35.0%	35.0%	30.0%	30.0%
58	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	35.0%	35.0%	30.0%	30.0%
59	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	35.0%	35.0%	30.0%	30.0%
60	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	35.0%	35.0%	30.0%	30.0%
61	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	35.0%	35.0%	30.0%	30.0%
62	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	35.0%	35.0%	30.0%	30.0%
63	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	35.0%	35.0%	30.0%	30.0%
64	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	35.0%	35.0%	30.0%	30.0%
65	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	35.0%	35.0%	30.0%	30.0%
66	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	35.0%	35.0%	30.0%	30.0%
67	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	35.0%	35.0%	30.0%	30.0%
68	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	35.0%	35.0%	30.0%	30.0%
69	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	35.0%	35.0%	30.0%	30.0%
>=70	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

*For service less than 25 years with age less than 60, the first year a member becomes eligible for Rule of 80 will continue to have an assumed 45% retirement rate. Any years thereafter, but prior to age 65, will have an assumed 20% retirement rate.

Demographic Assumptions – Retirement

Experience and Analysis

Total 2005-2010 experience:

By Age

Age	Exposure	# Retired	% Retired
45	22	5	22.73%
46	97	4	4.12%
47	934	65	6.96%
48	1,848	68	3.68%
49	2,522	94	3.73%
50	2,999	101	3.37%
51	3,384	311	9.19%
52	3,628	604	16.65%
53	3,606	822	22.80%
54	3,243	865	26.67%
55	9,284	1,069	11.51%
56	8,584	1,007	11.73%
57	7,776	975	12.54%
58	6,923	866	12.51%
59	5,943	900	15.14%
60	4,831	907	18.77%
61	3,717	687	18.48%
62	2,814	560	19.90%
63	2,068	454	21.95%
64	1,481	319	21.54%
65	1,059	301	28.42%
66	697	179	25.68%
67	467	107	22.91%
68	306	85	27.78%
69	206	51	24.76%
>=70	438	112	25.57%
Total	78,877	11,518	14.60%

By Service

Service	Exposure	# Retired	% Retired
<25	41,172	3,888	9.44%
25	5,662	808	14.27%
26	5,137	568	11.06%
27	4,861	535	11.01%
28	4,631	552	11.92%
29	4,330	651	15.03%
30	3,714	679	18.28%
>=31	9,370	3,837	40.95%
Total	78,877	11,518	14.60%

Average Retirement Age

Year	Average Retirement Age
2005 - 2006	57.2
2006 - 2007	57.2
2007 - 2008	57.7
2008 - 2009	57.8
2009 - 2010	58.2

Demographic Assumptions – Retirement

Experience and Analysis (Cont.)

Actual Experience 2005-2010 (weighted 10%, 15%, 20%, 25%, 30%), with proposed assumption:

	Service																							
	<25			25			26			27			28			29			30			>=31		
		Proposed			Proposed			Proposed			Proposed			Proposed			Proposed			Proposed			Proposed	
Age	Actual	Pre-2014	Post-2013	Actual	Pre-2014	Post-2013	Actual	Pre-2014	Post-2013	Actual	Pre-2014	Post-2013	Actual	Pre-2014	Post-2013	Actual	Pre-2014	Post-2013	Actual	Pre-2014	Post-2013	Actual	Pre-2014	Post-2013
45				34%	5%		10%	5%		0%	5%		0%	5%		0%	5%		0%	5%	5%	0%	5%	5%
46				2%	5%		20%	5%		0%	5%		0%	5%		0%	5%		0%	5%	5%	0%	5%	5%
47				7%	5%		11%	5%		19%	5%		0%	5%		22%	5%		0%	5%	5%	0%	5%	5%
48				4%	5%		2%	5%		6%	5%		10%	5%		14%	5%		21%	20%	45%	100%	40%	45%
49				5%	5%		3%	5%		2%	5%		4%	5%		26%	5%		32%	20%	45%	55%	40%	45%
50				7%	5%		2%	5%		2%	5%		2%	5%		1%	5%		41%	20%	45%	66%	40%	45%
51				7%	5%		2%	5%		2%	5%		2%	5%		16%	20%	20%	23%	20%	45%	55%	40%	45%
52				7%	5%		0%	5%		1%	5%		18%	20%	20%	17%	20%	20%	15%	20%	45%	54%	40%	45%
53				3%	5%		1%	5%		28%	30%	30%	20%	20%	20%	13%	20%	20%	15%	20%	45%	45%	40%	45%
54				5%	5%		32%	30%	30%	25%	20%	20%	13%	20%	20%	9%	20%	20%	13%	20%	45%	43%	40%	45%
55	3%	5%	5%	42%	40%	40%	32%	20%	20%	18%	20%	20%	16%	20%	20%	10%	20%	20%	16%	20%	45%	42%	40%	45%
56	5%	5%	5%	35%	20%	20%	23%	20%	20%	12%	20%	20%	15%	20%	20%	10%	20%	20%	20%	20%	45%	40%	40%	45%
57	6%	5%	5%	27%	20%	20%	19%	20%	20%	16%	20%	20%	17%	20%	20%	22%	20%	20%	21%	20%	45%	38%	40%	45%
58	8%	5%	5%	24%	20%	20%	15%	20%	20%	16%	20%	20%	24%	20%	20%	18%	20%	20%	19%	20%	45%	38%	40%	45%
59	10%	5%	5%	25%	20%	20%	27%	20%	20%	34%	20%	20%	18%	20%	20%	17%	20%	20%	23%	20%	45%	40%	40%	45%
60	15%	15%	15%	28%	20%	20%	32%	20%	20%	35%	20%	20%	20%	20%	20%	16%	20%	20%	13%	20%	45%	38%	40%	45%
61	13%	15%	15%	40%	20%	20%	28%	20%	20%	28%	20%	20%	25%	20%	20%	22%	20%	20%	13%	20%	45%	38%	40%	45%
62	16%	15%	15%	29%	20%	20%	13%	20%	20%	20%	20%	20%	21%	20%	20%	15%	20%	20%	20%	20%	45%	42%	40%	45%
63	17%	15%	15%	36%	20%	20%	18%	20%	20%	28%	20%	20%	19%	20%	20%	24%	20%	20%	56%	20%	45%	42%	40%	45%
64	18%	15%	15%	39%	20%	20%	20%	20%	20%	23%	20%	20%	25%	20%	20%	17%	20%	20%	15%	20%	45%	42%	40%	45%
65	23%	25%	25%	46%	40%	40%	42%	40%	40%	38%	40%	40%	31%	40%	40%	30%	40%	40%	10%	40%	45%	50%	40%	45%
66	23%	25%	25%	34%	30%	30%	27%	30%	30%	19%	30%	30%	32%	30%	30%	5%	30%	30%	21%	30%	45%	43%	40%	45%
67	21%	25%	25%	14%	30%	30%	22%	30%	30%	15%	30%	30%	30%	30%	30%	7%	30%	30%	56%	30%	45%	29%	40%	45%
68	24%	25%	25%	41%	30%	30%	33%	30%	30%	61%	30%	30%	35%	30%	30%	20%	30%	30%	41%	30%	45%	38%	40%	45%
69	23%	25%	25%	33%	30%	30%	42%	30%	30%	24%	30%	30%	22%	30%	30%	0%	30%	30%	16%	30%	45%	33%	40%	45%
>=70	25%	100%	100%	31%	100%	100%	20%	100%	100%	18%	100%	100%	28%	100%	100%	26%	100%	100%	22%	100%	100%	25%	100%	100%

*For service less than 25 years with age less than 60, the first year a member becomes eligible for Rule of 80 will continue to have an assumed 40% retirement rate. Any years thereafter, but prior to age 60, will have an assumed 20% retirement rate.

Demographic Assumptions – Retirement

Summary

- The retirement experience from 2005 to 2010 indicates a trend toward retirement at later ages. The average retirement age increased from 57.2 years of age in fiscal 2006 to 58.2 years of age in fiscal 2010. However, this trend is likely due to members waiting to retire with the bonus benefit at 31 years of service, which is an added cost to the system.
- Retirement patterns are likely to change if/when the 25-and-out and 31-year bonus benefits expire (scheduled for 2013), resulting in higher retirement rates when first eligible for unreduced retirement.
- Members who do not retire when first eligible for 25-and-out or rule-of-80 have a tendency to wait until they have 31 years of service.
- Review of the retirement experience from 2005 to 2010 shows that the incidence of retirement in the first year of eligibility for unreduced benefits is higher than other age/service combinations, but not as high as currently assumed.
  - A significant number of members become eligible for unreduced retirement before age 55.
- Utilization of the temporary retirement benefit for those with 25-29 years of service, but not eligible for the rule-of-80, has been slightly higher than assumed.
- Male and female retirement experiences were very similar from 2005 to 2010.
- There has been no significant difference in retirement patterns for those retiring between 25 and 29 years of service.

Demographic Assumptions – Retirement

Recommendation

- Based on recent experience, we recommend modifying the retirement assumption slightly, as shown previously, to reflect the recent experience and trends identified in the Summary above.
- However, the Board may wish to defer any change in retirement until the next experience study since the temporary 25-and-out and 31-year bonus benefits may have created a temporary shift in retirement experience that will be reversed if/when they expire.

Demographic Assumptions – Retirement

Impact

- The table below shows the impact of revising the retirement assumption.
  - The impact analysis below is as of 6/30/2010, the date of the last actuarial valuation. A similar impact would be expected at 6/30/2011.

	Baseline	Retirement	Increase / (Decrease)
Funded Status:			
Actuarial Accrued Liability (AAL)	$ 37,233,602,362	$ 37,362,320,421	$ 128,718,059
Actuarial Value of Assets (AVA)	$ 28,931,330,978	$ 28,931,330,978	$ -
Funded Status ($): AVA - AAL	$ (8,302,271,384)	$ (8,430,989,443)	$ (128,718,059)
Funded Status (%): AVA / AAL	77.70%	77.43%	(0.27%)
Market Value of Assets (MVA)	$ 23,755,741,472	$ 23,755,741,472	$ -
Funded Status ($): MVA - AAL	$ (13,477,860,890)	$ (13,606,578,949)	$ (128,718,059)
Funded Status (%): MVA / AAL	63.80%	63.58%	(0.22%)
Contribution Rate:			
Normal Cost (mid-year)	$ 987,255,055	$ 984,259,078	$ (2,995,977)
Normal Cost Rate	21.97%	21.90%	(0.07%)
Unfunded Liability Amortization (mid-year)	$ 421,162,139	$ 427,680,179	$ 6,518,040
Unfunded Liability Amortization Rate	9.37%	9.52%	0.15%
Annual Required Contribution	$ 1,408,417,194	$ 1,411,939,258	$ 3,522,064
Annual Required Contribution Rate	31.34%	31.42%	0.08%

Demographic Assumptions – Withdrawal

Description

- The withdrawal assumption is used to estimate the number of members that will terminate membership prior to retirement eligibility for all causes other than death or disability.
- In general, employees are more likely to withdraw early in their careers when they are more mobile and before they are vested in their retirement benefits.
  - Withdrawal assumptions are often based on age and/or service
- The withdrawal patterns of males and females can be different for various reasons, so actuarial assumptions are often sex distinct.
- Plan members who withdraw prior to vesting (five years of service) receive a refund of the contributions they paid into the system.
- Plan members who withdraw after vesting, but before retirement eligibility, have the choice of :
  1. Taking a refund of their contributions and forfeiting the vested retirement annuity benefit that is payable at retirement age, or
  2. Leaving their contributions in the fund and receiving a lifetime annuity benefit when they reach retirement age/eligibility.

Demographic Assumptions – Withdrawal

Current Assumption

Service	Termination Rate
0	19.00%
1	10.50%
2	8.50%
3	7.30%
4	6.20%
5	5.20%
6	4.30%
7	3.50%
8	3.00%
9	2.60%
10	2.30%
11	2.10%
12	1.90%
13	1.60%
14	1.30%
15	1.20%
16	1.10%
17	0.90%
18	0.80%
19	0.65%
20	0.50%
21	0.35%
22	0.25%
23	0.15%
24	0.05%
>=25	0.00%

Demographic Assumptions – Withdrawal

Experience and Analysis

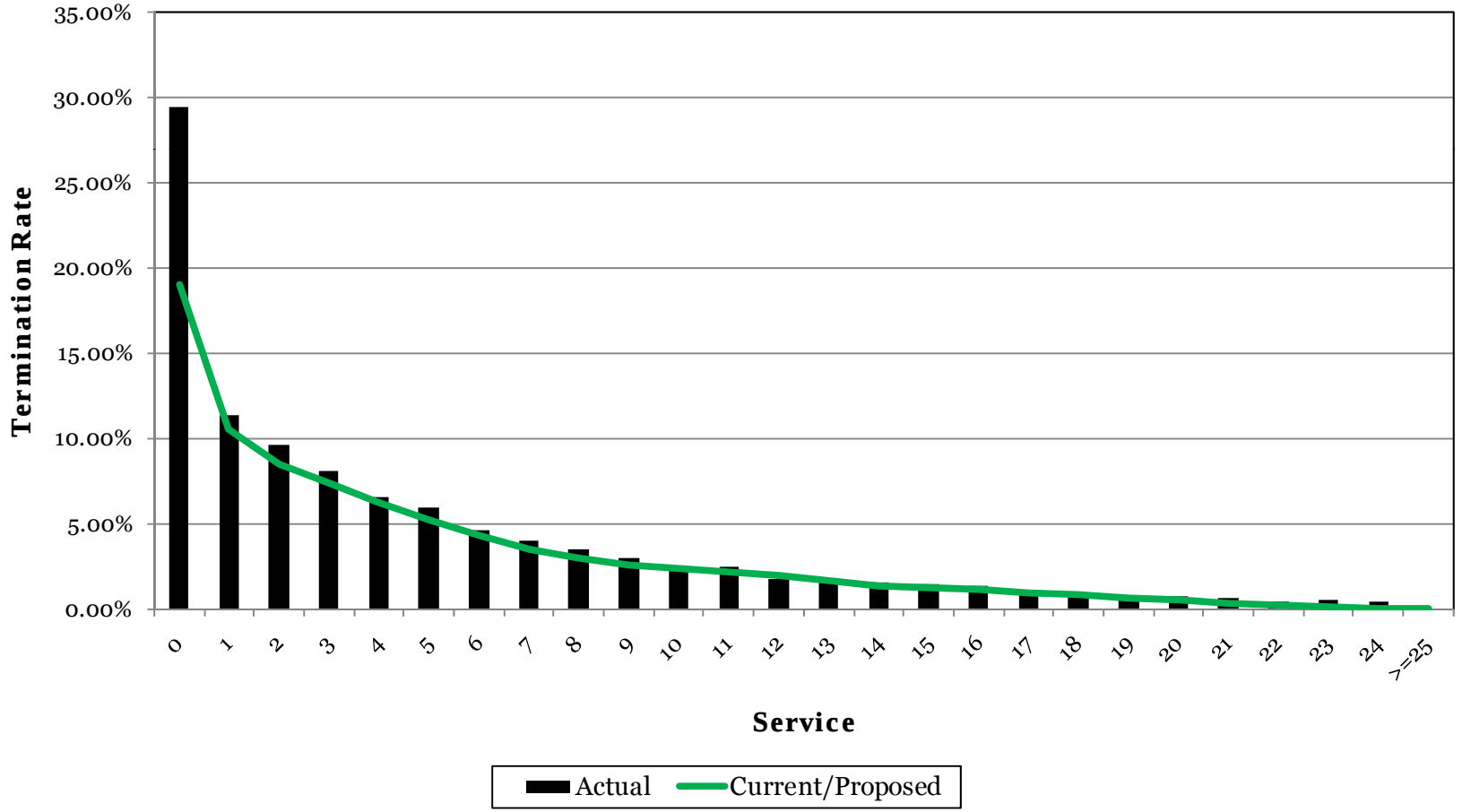
Total 2005-2010 experience:

	Male			Female			Total		
Service	Exposure	# Terminated	% Terminated	Exposure	# Terminated	% Terminated	Exposure	# Terminated	% Terminated
0	405	127	31.36%	1,409	389	27.61%	1,814	516	28.45%
1	7,054	867	12.29%	24,329	2,621	10.77%	31,383	3,488	11.11%
2	5,900	600	10.17%	20,929	1,993	9.52%	26,829	2,593	9.66%
3	5,267	413	7.84%	18,383	1,484	8.07%	23,650	1,897	8.02%
4	4,806	304	6.33%	16,726	1,119	6.69%	21,532	1,423	6.61%
5	4,087	216	5.29%	14,498	907	6.26%	18,585	1,123	6.04%
6	3,859	157	4.07%	13,711	686	5.00%	17,570	843	4.80%
7	3,818	129	3.38%	13,172	566	4.30%	16,990	695	4.09%
8	3,697	106	2.87%	12,470	469	3.76%	16,167	575	3.56%
9	3,554	109	3.07%	11,521	358	3.11%	15,075	467	3.10%
10	3,292	70	2.13%	10,494	283	2.70%	13,786	353	2.56%
11	3,023	68	2.25%	9,609	248	2.58%	12,632	316	2.50%
12	2,763	48	1.74%	8,809	155	1.76%	11,572	203	1.75%
13	2,437	46	1.89%	7,904	138	1.75%	10,341	184	1.78%
14	2,138	39	1.82%	7,044	102	1.45%	9,182	141	1.54%
15	1,892	34	1.80%	6,372	86	1.35%	8,264	120	1.45%
16	1,711	27	1.58%	5,728	70	1.22%	7,439	97	1.30%
17	1,566	17	1.09%	5,196	52	1.00%	6,762	69	1.02%
18	1,459	12	0.82%	4,856	40	0.82%	6,315	52	0.82%
19	1,381	12	0.87%	4,537	37	0.82%	5,918	49	0.83%
20	1,289	14	1.09%	4,248	23	0.54%	5,537	37	0.67%
21	1,221	8	0.66%	3,933	28	0.71%	5,154	36	0.70%
22	1,105	2	0.18%	3,647	16	0.44%	4,752	18	0.38%
23	1,016	4	0.39%	3,298	18	0.55%	4,314	22	0.51%
24	975	4	0.41%	3,103	15	0.48%	4,078	19	0.47%
>=25	0	0	0.00%	0	0	0.00%	0	0	0.00%
Total	69,715	3,433	4.92%	235,926	11,903	5.05%	305,641	15,336	5.02%

Demographic Assumptions – Withdrawal

Experience and Analysis (Cont.)

Actual Experience 2005-2010 (weighted 10%, 15%, 20%, 25%, 30%), compared to current withdrawal assumption:



Demographic Assumptions – Withdrawal

Summary

- Review of the withdrawal experience from 2005 to 2010 continues to show that withdrawal is highly correlated with service, with very few withdrawals occurring after five years of service.
- Withdrawal experience has also been consistent from 2005 to 2010, indicating that the recession and other factors have not significantly influenced the experience, though we have weighted recent experience more heavily in our analysis.
- Male and female withdrawal experience was very similar from 2005 to 2010.
- Overall, the current withdrawal assumption is a very close approximation of actual experience.

Recommendation

- No change. Continue to use current assumption.

Impact

- No impact to AAL, NC, and ARC.

Demographic Assumptions – Disability

Description

- The disability assumption is used to estimate the number of members that will terminate employment prior to retirement eligibility due to a disability.
- In general, disability assumptions tend to be age-based and sex distinct.
  - The likelihood of disability grows with age.
- Plan members who become disabled are entitled to lifetime benefits commencing immediately.
  - This is why disability is studied separately from the withdrawal assumption.

Demographic Assumptions – Disability

Current Assumption

Age	Disability Rate
<25	0.0000%
25	0.0000%
26	0.0000%
27	0.0000%
28	0.0000%
29	0.0000%
30	0.0090%
31	0.0095%
32	0.0100%
33	0.0105%
34	0.0110%
35	0.0130%
36	0.0150%
37	0.0170%
38	0.0190%
39	0.0235%
40	0.0280%
41	0.0325%
42	0.0370%

Age	Disability Rate
43	0.0415%
44	0.0460%
45	0.0505%
46	0.0560%
47	0.0615%
48	0.0670%
49	0.0725%
50	0.0780%
51	0.0925%
52	0.1070%
53	0.1215%
54	0.1360%
55	0.1535%
56	0.1710%
57	0.1885%
58	0.2060%
59	0.2235%
>=60	0.0000%

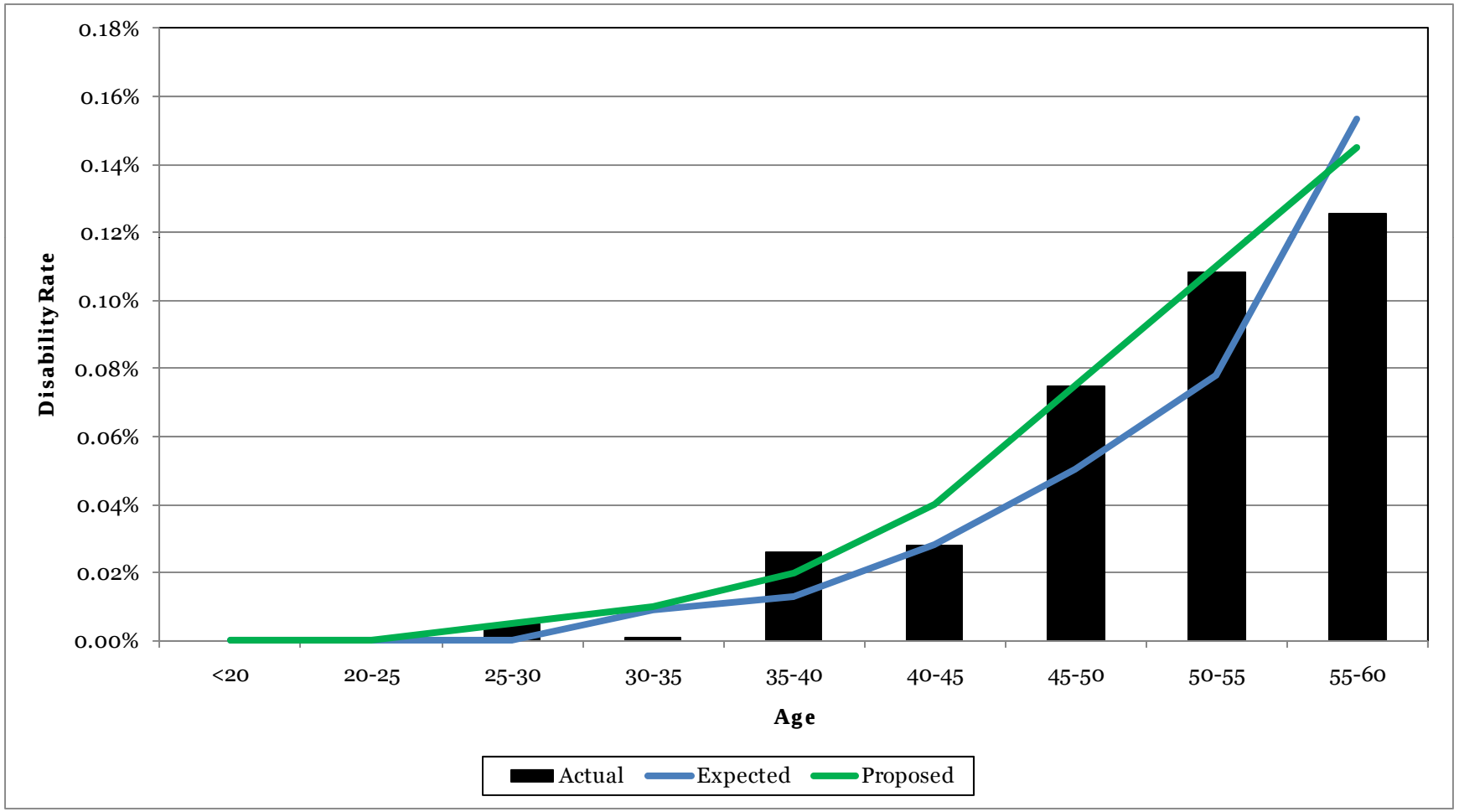
Demographic Assumptions – Disability

Experience and Analysis

	Gender								
Age	Male			Female			Total		
	Exposed	# Disabled	% Disabled	Exposed	# Disabled	% Disabled	Exposed	# Disabled	% Disabled
<20	0	0	0.00%	1	0	0.00%	1	0	0.00%
20-25	1,273	0	0.00%	6,962	0	0.00%	8,235	0	0.00%
25-30	11,039	1	0.01%	41,444	1	0.00%	52,483	2	0.00%
30-35	13,397	1	0.01%	40,369	0	0.00%	53,766	1	0.00%
35-40	13,296	1	0.01%	39,213	13	0.03%	52,509	14	0.03%
40-45	11,311	1	0.01%	36,245	11	0.03%	47,556	12	0.03%
45-50	11,233	10	0.09%	40,318	29	0.07%	51,551	39	0.08%
50-55	11,592	4	0.03%	43,636	56	0.13%	55,228	60	0.11%
55-60	8,860	9	0.10%	33,839	41	0.12%	42,699	50	0.12%
60-65	4,098	0	0.00%	12,731	0	0.00%	16,829	0	0.00%
65-70	847	0	0.00%	2,292	0	0.00%	3,139	0	0.00%
>=70	184	0	0.00%	348	0	0.00%	532	0	0.00%
Total	87,130	27	0.03%	297,398	151	0.05%	384,528	178	0.05%

Demographic Assumptions – Disability

Experience and Analysis



Demographic Assumptions – Disability

Summary

- Due to the small number of disabilities from 2005 to 2010, data was combined for males and females and further consolidated into 5-year age bands for analysis.
- Disability experience was consistent from 2005 to 2010, indicating that the recession and other factors have not significantly influenced the experience, though we have weighted recent experience more heavily in our analysis.
- While the overall incidence of disability is low, it was slightly greater than the current assumption at most ages.

Demographic Assumptions – Disability

Recommendation (Cont.)

- We recommend the disability table below, which represents a slight increase in disability at most ages when compared to the current assumption.

Age	Disability Rate	Age	Disability Rate	Age	Disability Rate
<25	0.0000%	37	0.0200%	49	0.0890%
25	0.0017%	38	0.0240%	50	0.0960%
26	0.0033%	39	0.0280%	51	0.1030%
27	0.0050%	40	0.0320%	52	0.1100%
28	0.0060%	41	0.0360%	53	0.1170%
29	0.0070%	42	0.0400%	54	0.1240%
30	0.0080%	43	0.0470%	55	0.1310%
31	0.0090%	44	0.0540%	56	0.1380%
32	0.0100%	45	0.0610%	57	0.1450%
33	0.0120%	46	0.0680%	58	0.1520%
34	0.0140%	47	0.0750%	59	0.1590%
35	0.0160%	48	0.0820%	>=60	0.0000%
36	0.0180%				

Demographic Assumptions – Disability

Impact

- The table below shows the impact of raising the disability assumption.
  - The impact analysis below is as of 6/30/2010, the date of the last actuarial valuation. A similar impact would be expected at 6/30/2011.

		Baseline	Disability	Increase / (Decrease)
Funded Status:				
	Actuarial Accrued Liability (AAL)	$ 37,233,602,362	$ 37,234,280,386	$ 678,024
	Actuarial Value of Assets (AVA)	$ 28,931,330,978	$ 28,931,330,978	$ -
	Funded Status ($): AVA - AAL	$ (8,302,271,384)	$ (8,302,949,408)	$ (678,024)
	Funded Status (%): AVA / AAL	77.70%	77.70%	0.00%
	Market Value of Assets (MVA)	$ 23,755,741,472	$ 23,755,741,472	$ -
	Funded Status ($): MVA - AAL	$ (13,477,860,890)	$ (13,478,538,914)	$ (678,024)
	Funded Status (%): MVA / AAL	63.80%	63.80%	0.00%
Contribution Rate:				
	Normal Cost (mid-year)	$ 987,255,055	$ 987,626,634	$ 371,578
	Normal Cost Rate	21.97%	21.98%	0.01%
	Unfunded Liability Amortization (mid-year)	$ 421,162,139	$ 421,196,473	$ 34,334
	Unfunded Liability Amortization Rate	9.37%	9.37%	0.00%
	Annual Required Contribution	$ 1,408,417,194	$ 1,408,823,107	$ 405,913
	Annual Required Contribution Rate	31.34%	31.35%	0.01%

Demographic Assumptions – Refunds

Description

- The refund assumption is used to estimate the number of inactive members with vested benefits that will take a refund of their contributions and forfeit their vested annuity benefit.
  - Upon withdrawal with more than five years of service, but prior to retirement eligibility, members may:
    1. Take a refund of their contributions and forfeit the annuity benefit they accrued, or
    2. Leave their contributions in the fund and receive a lifetime annuity benefit once they reach retirement eligibility.
- The refund assumption is applied to members who have already terminated with vested benefits and to active members that are expected to withdraw prior to retirement.

Demographic Assumptions – Refunds

Current Assumption

- The current Plan refund assumption is as follows:
  - 30% of all members who terminate after five years of service, for reasons other than death, retirement and disability, are assumed to take a refund of their accumulated contributions and forfeit any vested annuity benefit.
  - 70% of such members are assumed to leave their contributions with the system and receive a lifetime annuity benefit when eligible for retirement.

Experience and Analysis

- The following table shows the number of inactive members who withdrew their membership by year.

Year	Number of Inactive Members	Number Electing Refund	Percent Electing Refund
2005-2006	11,662	1,331	11.41%
2006-2007	11,657	1,446	12.40%
2007-2008	11,537	1,400	12.13%
2008-2009	11,433	1,332	11.65%
2009-2010	11,599	1,602	13.81%
Total	57,888	7,111	12.28%

Demographic Assumptions – Refunds

Summary

- There is likely an age and/or service-based pattern for refund, since the older a member is and the more service they have, the more likely they are to elect the deferred annuity benefit. However, the assumption has very little impact on the overall liability of the system.
- Experience shows that the likelihood of inactive members taking a refund of their contributions is less than currently assumed.

Recommendation

- Assume 12% of all members who terminate after five years of service, for reasons other than death, retirement and disability, take a refund of their accumulated contributions and forfeit any vested annuity benefit.
- The remaining 88% of such members would be assumed to leave their contributions with the system and receive a lifetime annuity benefit when eligible for retirement.

Demographic Assumptions – Refunds

Impact

- The table below shows the impact of lowering the refund election assumption from 30% to 12%.
  - The impact analysis below is as of 6/30/2010, the date of the last actuarial valuation. A similar impact would be expected at 6/30/2011.

		Baseline	Refunds	Increase / (Decrease)
Funded Status:				
	Actuarial Accrued Liability (AAL)	$ 37,233,602,362	$ 37,268,505,504	$ 34,903,142
	Actuarial Value of Assets (AVA)	$ 28,931,330,978	$ 28,931,330,978	$ -
	Funded Status ($): AVA - AAL	$ (8,302,271,384)	$ (8,337,174,526)	$ (34,903,142)
	Funded Status (%): AVA / AAL	77.70%	77.63%	(0.07%)
	Market Value of Assets (MVA)	$ 23,755,741,472	$ 23,755,741,472	$ -
	Funded Status ($): MVA - AAL	$ (13,477,860,890)	$ (13,512,764,032)	$ (34,903,142)
	Funded Status (%): MVA / AAL	63.80%	63.74%	(0.06%)
Contribution Rate:				
	Normal Cost (mid-year)	$ 987,255,055	$ 984,799,930	$ (2,455,125)
	Normal Cost Rate	21.97%	21.91%	(0.06%)
	Unfunded Liability Amortization (mid-year)	$ 421,162,139	$ 422,929,568	$ 1,767,429
	Unfunded Liability Amortization Rate	9.37%	9.41%	0.04%
	Annual Required Contribution	$ 1,408,417,194	$ 1,407,729,499	$ (687,695)
	Annual Required Contribution Rate	31.34%	31.32%	(0.02%)

Demographic Assumptions – Service Purchases

Description

- There are two types of service purchases that occur in the Plan:
  1. Reinstated Service – If a member terminates and withdraws their contributions from the fund, but later returns to active employment covered by the system, they may buy back the service they previously earned by returning their previous contributions to the fund.
  2. True Service Purchases – In certain circumstances, members are allowed to buy service that was earned outside of the fund, such as military service or service earned at schools that are not covered by ABC Retirement System.
- For the past several years, ABC Retirement System has experienced actuarial losses resulting from purchased and reinstated service.
  - The cost to purchase service is based on the prevailing contribution rate, not the true actuarial value of the service being purchased.
  - The majority of the service is being purchased by members who are later in their careers (i.e. older with more years of service). The actuarial value of an additional year of service for such members is more than the cost, resulting in losses.
- A service purchase assumption would capture expected purchases in the liability and normal cost so that the losses are anticipated and growth in the unfunded liability due to service purchases is prevented.

Demographic Assumptions – Service Purchases

Current Assumption

- Currently there is no assumption regarding service purchases. The liability and assets resulting from service purchases are recognized after the transactions occur, which has resulted in consistent actuarial losses.

Experience and Analysis

- The table below shows the impact of service purchases during the past five years:

($ in Millions)					
Experience Year	Liability Loss	Employee Contributions	Net Loss	Normal Cost (Mid-Year)	Net Loss As a % of Normal Cost
2005-2006	$127.0	$77.3	$49.7	$731.8	6.79%
2006-2007	$80.2	$45.8	$34.4	$799.6	4.30%
2007-2008	$102.8	$55.1	$47.7	$844.6	5.65%
2008-2009	$60.5	$41.0	$19.5	$901.2	2.16%
2009-2010	$68.0	$47.2	$20.8	$969.5	2.15%

Demographic Assumptions – Service Purchases

Summary

- The system has consistently experienced actuarial losses due to service purchases.
- Since the cost to purchase service is a function of the contribution rate, the actuarial losses have trended down as the contribution rate has gone up.
  - We expect contribution levels to be at or above the current level for several years, so recent experience is likely a better indicator of future actuarial losses, at least in the short-term.
- An assumption that increases the normal cost (the annual cost of benefits accruing) could be used to anticipate the losses, rather than allowing the unfunded liability to grow.

Recommendation

- We expect contribution rates to increase or remain level in the short-term, so we recommend "loading" the normal cost each year by 2.00%, in order to anticipate the losses incurred from service purchases.
- If legislative action is taken to adjust the member cost for purchasing service, this assumption will need to be modified.

Demographic Assumptions – Service Purchases

Impact

- The table below shows the impact of applying a 2.0% load to the normal cost for service purchases.
  - The impact analysis below is as of 6/30/2010, the date of the last actuarial valuation. A similar impact would be expected at 6/30/2011.

		Baseline	Service Purchases	Increase / (Decrease)
Funded Status:				
	Actuarial Accrued Liability (AAL)	$ 37,233,602,362	$ 37,233,602,362	$ -
	Actuarial Value of Assets (AVA)	$ 28,931,330,978	$ 28,931,330,978	$ -
	Funded Status ($): AVA - AAL	$ (8,302,271,384)	$ (8,302,271,384)	$ -
	Funded Status (%): AVA / AAL	77.70%	77.70%	0.00%
	Market Value of Assets (MVA)	$ 23,755,741,472	$ 23,755,741,472	$ -
	Funded Status ($): MVA - AAL	$ (13,477,860,890)	$ (13,477,860,890)	$ -
	Funded Status (%): MVA / AAL	63.80%	63.80%	0.00%
Contribution Rate:				
	Normal Cost (mid-year)	$ 987,255,055	$ 1,007,000,156	$ 19,745,101
	Normal Cost Rate	21.97%	22.41%	0.44%
	Unfunded Liability Amortization (mid-year)	$ 421,162,139	$ 421,162,139	$ -
	Unfunded Liability Amortization Rate	9.37%	9.37%	0.00%
	Annual Required Contribution	$ 1,408,417,194	$ 1,428,162,295	$ 19,745,101
	Annual Required Contribution Rate	31.34%	31.78%	0.44%

Demographic Assumptions – Dependent Assumptions

Description

- In certain circumstances, the spouse and/or dependent beneficiary(ies) of a member may be eligible to receive benefits upon the death of a member.
  - If a members dies while active or inactive and vested
  - After a member's death in retirement with a joint and survivor annuity election
- Prior to a member's retirement, spouse/beneficiary data is typically not collected and therefore assumptions are made to estimate the benefits that would be payable upon the death of a member.
- Dependent assumptions typically include:
  - The percentage of members that are married or have an eligible dependent
  - The age difference between the member and their spouse or eligible dependent
- The survivor benefits in the Plan extend to dependent children, so there are also assumptions regarding the value of the survivor benefits payable to dependent children in the event a member dies during active service.

Demographic Assumptions – Dependent Assumptions

Current Assumptions

- Marriage – The percentage of members assumed to be married is shown in the table below.

Age	Male	Female
20	40%	60%
30	84%	87%
40	87%	86%
50	85%	84%
60	79%	81%

- Age difference – Male spouses are assumed to be 3 years older than female spouses.
- Survivor benefits for dependent children – Upon the death of an active member that is under 40 years old, the value of benefits payable to dependent children is assumed to be $165,000.
- When valuing beneficiary benefits, beneficiaries who are under age 22 at the valuation date are assumed to received payment until age 22 and those over age 22 are assumed to receive payments for life.

Demographic Assumptions – Dependent Assumptions

Experience and Analysis

- Marriage

Male Members:			
	Total		
Age	# Newly Retired	# Married	% Married
<50	66	50	75.76%
50-54	655	560	85.50%
55-59	1,512	1,262	83.47%
60-64	1,064	900	84.59%
65-69	438	290	66.21%
>=70	89	60	67.42%
Total	3,824	3,122	81.64%

Female Members:			
	Total		
Age	# Newly Retired	# Married	% Married
<50	203	163	80.30%
50-54	1,929	1,451	75.22%
55-59	4,394	3,160	71.92%
60-64	3,804	2,580	67.82%
65-69	867	574	66.21%
>=70	127	81	63.78%
Total	11,324	8,009	70.73%

Demographic Assumptions – Dependent Assumptions

Experience and Analysis

- Age Difference
  - Spouse/Dependent data is most reliable for retired members who have elected a joint and survivor form of benefit. Prior to retirement spouse/dependent data is generally not collected.
  - A review of the 6/30/2010 population of married retirees shows that males tend to be older than their spouses.

Member Gender	Total Retirees	Member Age	Beneficiary Age	M-F Difference
Male	11,165	69.08	68.11	0.97
Female	21,253	69.14	72.37	3.23
Weighted Average M-F Difference				2.45

  - However, a review of recent retirees show that, regardless of gender, retirees have been older than their spouses.

Male Members:

Experience Year	# Newly Retired	Member Age	Beneficiary Age	Difference
2004-2005	575	57.80	53.12	4.68
2005-2006	523	58.16	54.04	4.12
2006-2007	499	58.18	54.38	3.80
2007-2008	526	58.82	54.33	4.49
2008-2009	519	58.87	55.01	3.86
2009-2010	480	59.47	54.52	4.95
Total	3,122	58.53	54.21	4.32

Female Members:

Experience Year	# Newly Retired	Member Age	Beneficiary Age	Difference
2004-2005	1,316	57.90	54.35	3.55
2005-2006	1,217	58.18	54.11	4.07
2006-2007	1,204	58.32	54.32	4.00
2007-2008	1,346	58.66	54.62	4.04
2008-2009	1,530	58.90	54.72	4.18
2009-2010	1,396	59.25	54.59	4.66
Total	8,009	58.56	54.47	4.09

Demographic Assumptions – Dependent Assumptions

Experience and Analysis (Cont.)

- Survivor benefits for dependent children
  - Data for child beneficiaries is limited, primarily because few active members die prior to retirement.
  - Survivor benefits to children represent a very small percentage of the overall liability.
  - We propose updating the current assumption using the following conservative approach:
    - All active members under age 50 have 2 dependent children (i.e. payment will be $860/month)
    - Each child is assumed to receive payments for 18 years if the member is under 32 years of age, grading down to 0 years if the member is age 50 or older.
  - We also propose maintaining the current assumption that beneficiary payment to those under 22 years of age on the valuation date will cease at age 22 and those over age 22 on the valuation date will receive payments for life.

Demographic Assumptions – Dependent Assumptions

Summary

- A study of members that retired from 2005-2010 shows that a large percentage of both male and females are married at the time of retirement.
- Data on the total current population of retirees shows that males are, on average, about 2 years older than their female spouses. However, data on the recent retiree population shows a change in which members (male or female) are, on average, about 4 years older than their spouses.
- It is unclear how the current assumption concerning the value of payments to dependent children upon the death of an active member was developed.

Recommendation

- Simplify the current marriage assumption by assuming 80% of male members are married and 70% of female members are married.
- Assume that members (male or female) are 4 years older than their spouses.

Demographic Assumptions – Dependent Assumptions

Recommendation (Cont.)

- Update the assumption concerning the value of benefits to dependent children as previously described. This produces the following values based on the age of the member:

Member Age	Annual Benefit	Value of Benefits Paid to Age 18
<=32	$ 10,320	$ 185,760
33	$ 10,320	$ 175,440
34	$ 10,320	$ 165,120
35	$ 10,320	$ 154,800
36	$ 10,320	$ 144,480
37	$ 10,320	$ 134,160
38	$ 10,320	$ 123,840
39	$ 10,320	$ 113,520
40	$ 10,320	$ 103,200
41	$ 10,320	$ 92,880
42	$ 10,320	$ 82,560
43	$ 10,320	$ 72,240
44	$ 10,320	$ 61,920
45	$ 10,320	$ 51,600
46	$ 10,320	$ 41,280
47	$ 10,320	$ 30,960
48	$ 10,320	$ 20,640
49	$ 10,320	$ 10,320
50	$ -	$ -

- Maintain the current assumption that beneficiary payment to those under 22 years of age on the valuation date will cease at age 22 and those over age 22 on the valuation date will receive payments for life.

Demographic Assumptions – Dependent Assumptions

Impact

- The table below shows the impact of revising the marriage, age difference, and benefits to dependent children assumptions.
  - The impact analysis below is as of 6/30/2010, the date of the last actuarial valuation. A similar impact would be expected at 6/30/2011.

		Baseline	Dependent Assumptions	Increase / (Decrease)
Funded Status:				
	Actuarial Accrued Liability (AAL)	$ 37,233,602,362	$ 37,241,123,135	$ 7,520,773
	Actuarial Value of Assets (AVA)	$ 28,931,330,978	$ 28,931,330,978	$ -
	Funded Status ($): AVA - AAL	$ (8,302,271,384)	$ (8,309,792,157)	$ (7,520,773)
	Funded Status (%): AVA / AAL	77.70%	77.69%	(0.01%)
	Market Value of Assets (MVA)	$ 23,755,741,472	$ 23,755,741,472	$ -
	Funded Status ($): MVA - AAL	$ (13,477,860,890)	$ (13,485,381,663)	$ (7,520,773)
	Funded Status (%): MVA / AAL	63.80%	63.79%	(0.01%)
Contribution Rate:				
	Normal Cost (mid-year)	$ 987,255,055	$ 987,764,329	$ 509,273
	Normal Cost Rate	21.97%	21.98%	0.01%
	Unfunded Liability Amortization (mid-year)	$ 421,162,139	$ 421,542,977	$ 380,838
	Unfunded Liability Amortization Rate	9.37%	9.38%	0.01%
	Annual Required Contribution	$ 1,408,417,194	$ 1,409,307,306	$ 890,112
	Annual Required Contribution Rate	31.34%	31.36%	0.02%

Economic Assumptions – Inflation

Description

- Inflation represents the annual increase in the cost of living.
- There are several published indices that track inflation over time, the most common of which is the Consumer Price Index for Urban Consumers that is published by the U. S. Department of Labor's Bureau of Labor Statistics.
  - Otherwise known as the "CPI-U" index.
- Inflation is one of the "building blocks" of most economic actuarial assumptions, such as:
  - Expected asset returns (inflation + real return)
  - Individual salary (inflation + productivity + merit/promotion)
  - Total payroll growth (inflation + real wage growth)
- Historically, inflation has also been a key driver in the cost-of-living adjustments granted to retirees.
- The inflation assumption is not always disclosed in actuarial reports because it is a component of other economic assumptions.
  - The inflation component of each economic assumption should be consistent.
  - The inflation assumption should be consistent between all of ABC Retirement System's Plans.

Economic Assumptions – Inflation

Current Assumption

- The current inflation assumption is 3.25% compounded annually.

Experience

- The following table shows historic U. S. inflation, as measured by the CPI-U index in June of each year.

Date	CPI-U	Annual Increase
June 1980	82.700	
June 1981	90.600	9.55%
June 1982	97.000	7.06%
June 1983	99.500	2.58%
June 1984	103.700	4.22%
June 1985	107.600	3.76%
June 1986	109.500	1.77%
June 1987	113.500	3.65%
June 1988	118.000	3.96%
June 1989	124.100	5.17%
June 1990	129.900	4.67%
June 1991	136.000	4.70%
June 1992	140.200	3.09%
June 1993	144.400	3.00%
June 1994	148.000	2.49%
June 1995	152.500	3.04%
June 1996	156.700	2.75%
June 1997	160.300	2.30%
June 1998	163.000	1.68%
June 1999	166.200	1.96%
June 2000	172.400	3.73%
June 2001	178.000	3.25%
June 2002	179.900	1.07%
June 2003	183.700	2.11%
June 2004	189.700	3.27%
June 2005	194.500	2.53%
June 2006	202.900	4.32%
June 2007	208.352	2.69%
June 2008	218.815	5.02%
June 2009	215.693	-1.43%
June 2010	217.963	1.05%

Average Inflation for the Period Ending June 30, 2010	
5 Years	2.30%
10 Years	2.37%
15 Years	2.41%
20 Years	2.62%
25 Years	2.86%
30 Years	3.28%

Economic Assumptions – Inflation

Analysis

- With regard to inflation, historical experience is generally not given much weight in terms of setting future expectations.
  - There are a number of factors that can change the economic outlook very quickly
- Current market conditions and the expectations of economists and other financial experts are weighed more heavily in setting inflation assumptions.
  - Observable data in this regard can be pulled from the financial markets by analyzing the difference in yields between fixed coupon U. S. Treasury bonds and inflation-protected U. S. Treasuries ("TIPS").
  - As of 5/17/2011, yields on Treasuries and TIPS for various maturities were as follows:

	Maturity				
Security	5 years	7 years	10 years	20 years	30 years
US Treasuries	1.80%	2.47%	3.12%	3.94%	4.23%
US TIPS	-0.28%	0.29%	0.82%	1.52%	1.79%
Expected Inflation	2.08%	2.18%	2.30%	2.42%	2.44%

Economic Assumptions – Inflation

Summary

- In recent years, inflation has averaged between 2.25% and 2.50%.
- Long-term future inflation expectations based on the yields of Treasuries and TIPS is roughly 2.40%.
- It is our understanding that your asset advisors will be using a long-term inflation rate of 2.50% in their analysis.

Recommendation

- We concur with the asset advisors and recommend an inflation assumption of 2.50%.

Impact

- Inflation is a component of other economic assumptions that directly impact the actuarial valuation of the Plan. Sensitivity analysis will be shown for those economic assumptions.

Economic Assumptions – Payroll Growth

Description

- The current method used for amortizing unfunded past service liabilities is to amortize the unfunded actuarial accrued liability ("UAAL") over 30 years as a level percent of payroll. This requires an assumption of future payroll growth.
  - This approach is used for developing the contribution rates for the Plan, as well as preparing disclosure information under GASB.
- The payroll growth assumption consists of the following components:
  - Inflation
  - Real wage growth
- Real wage growth can be measured by analyzing wage growth, net of inflation.
- For the Plan, the cost of active health insurance is included in total pay, which has grown faster than ordinary take home pay.
- For GASB purposes, the payroll growth assumptions is not to include expected growth in population.

Economic Assumptions – Payroll Growth

Current Assumption

- The current payroll growth assumption is 5.00% compounded annually, composed of 3.25% inflation and 1.75% real wage growth.

Experience and Analysis

- The following table shows historic Plan payroll growth, net of inflation.
  - Note that growth in average pay was analyzed to eliminate the effects of census changes.
  - The real growth in pay includes growth due to increases in health insurance costs.

June 30	Total Payroll ($ in millions)	Number of Active Members	Average Pay Per Active Member	Growth in Average Pay	Inflation Per CPI-U Index	Real Growth in Average Pay
2000	$2,245.4	55,911	$40,161			
2001	$2,533.9	60,175	$42,108	4.85%	3.25%	1.55%
2002	$2,843.3	64,294	$44,223	5.02%	1.07%	3.91%
2003	$3,135.9	68,124	$46,032	4.09%	2.11%	1.94%
2004	$3,350.3	70,921	$47,240	2.62%	3.27%	-0.62%
2005	$3,473.5	71,611	$48,506	2.68%	2.53%	0.15%
2006	$3,695.4	73,818	$50,061	3.21%	4.32%	-1.07%
2007	$3,894.7	75,388	$51,663	3.20%	2.69%	0.50%
2008	$4,128.2	76,846	$53,721	3.98%	5.02%	-0.99%
2009	$4,294.2	77,789	$55,204	2.76%	-1.43%	4.25%
2010	$4,362.8	77,885	$56,016	1.47%	1.05%	0.41%
	2000 - 2005 Geometric Average:			3.85%	2.44%	1.37%
	2005 - 2010 Geometric Average:			2.92%	2.30%	0.60%
	2000 - 2010 Geometric Average:			3.38%	2.37%	0.99%

Economic Assumptions – Payroll Growth

Experience and Analysis (Cont.)

- The following table shows historic Plan payroll growth, net of inflation and health care insurance costs
  - Note that growth in average pay was analyzed to eliminate the effects of census changes.

June 30	Total Payroll Exc. Insurance ($ in millions)	Number of Active Members	Average Pay Per Active Member	Growth in Average Pay	Inflation Per CPI-U Index	Real Growth in Average Pay
2000	$2,121.3	55,911	$37,941			
2001	$2,382.9	60,175	$39,599	4.37%	3.25%	1.09%
2002	$2,657.4	64,294	$41,332	4.38%	1.07%	3.27%
2003	$2,914.3	68,124	$42,779	3.50%	2.11%	1.36%
2004	$3,097.8	70,921	$43,679	2.10%	3.27%	-1.13%
2005	$3,202.1	71,611	$44,715	2.37%	2.53%	-0.15%
2006	$3,400.3	73,818	$46,064	3.02%	4.32%	-1.25%
2007	$3,577.4	75,388	$47,453	3.02%	2.69%	0.32%
2008	$3,785.2	76,846	$49,257	3.80%	5.02%	-1.16%
2009	$3,930.5	77,789	$50,528	2.58%	-1.43%	4.07%
2010	$3,984.7	77,885	$51,161	1.25%	1.05%	0.20%
	2000 - 2005 Geometric Average:			3.34%	2.44%	0.88%
	2005 - 2010 Geometric Average:			2.73%	2.30%	0.42%
	2000 - 2010 Geometric Average:			3.03%	2.37%	0.65%

Economic Assumptions – Payroll Growth

Experience and Analysis (Cont.)

- The table below illustrates the proportion of each member's salary that is related to the cost of active health care insurance.
- The annual increase in the cost of insurance is also shown.

Experience Year	Active Head Count	Total Salary	Average Salary	Total Insurance Cost	Average Insurance Cost	Insurance Cost as % of Total Salary	Annual Increase in Insurance Cost
2000-2001	60,175	2,533,863,230	42,108	151,009,357	2,509	5.960%	
2001-2002	64,294	2,843,270,582	44,223	185,898,145	2,891	6.538%	15.217%
2002-2003	68,124	3,135,912,091	46,032	221,661,247	3,254	7.068%	12.535%
2003-2004	70,921	3,350,283,648	47,240	252,490,046	3,560	7.536%	9.417%
2004-2005	71,611	3,473,546,914	48,506	271,473,809	3,791	7.815%	6.482%
2005-2006	73,818	3,695,437,373	50,061	295,097,506	3,998	7.985%	5.451%
2006-2007	75,388	3,894,734,100	51,663	317,371,688	4,210	8.149%	5.309%
2007-2008	76,846	4,128,240,354	53,721	343,072,492	4,464	8.310%	6.047%
2008-2009	77,789	4,294,233,464	55,204	363,692,477	4,675	8.469%	4.725%
2009-2010	77,885	4,362,798,799	56,016	378,113,328	4,855	8.667%	3.837%

Economic Assumptions – Payroll Growth

Summary

- Inflation has averaged between 2.25% and 2.50%.
- Payroll growth in excess of inflation (i.e. real payroll growth), has been roughly 1.00% since 2000, but has been declining in the last 5 years.
  - Payroll growth, net of inflation and insurance costs, accounted for about 0.65% of the total, but has declined in recent years.
  - Growth in active health care insurance cost accounted for about 0.35% of the total and is expected to increase as insurance premiums become a larger portion of the member's gross salary.

Recommendation

- We recommend a payroll growth assumption of 3.50%, consisting of:
  - 2.50% inflation, and
  - 0.50% real wage growth
  - 0.50% wage growth due to the inclusion of health insurance costs in gross pay

Economic Assumptions – Payroll Growth

Impact

- The table below shows the impact of lowering the payroll growth assumption from 5.00% to 3.50%.
  - The impact analysis below is as of 6/30/2010, the date of the last actuarial valuation. A similar impact would be expected at 6/30/2011.

		Baseline	Payroll Increases	Increase / (Decrease)
Funded Status:				
	Actuarial Accrued Liability (AAL)	$ 37,233,602,362	$ 37,233,602,362	$ -
	Actuarial Value of Assets (AVA)	$ 28,931,330,978	$ 28,931,330,978	$ -
	Funded Status ($): AVA - AAL	$ (8,302,271,384)	$ (8,302,271,384)	$ -
	Funded Status (%): AVA / AAL	77.70%	77.70%	0.00%
	Market Value of Assets (MVA)	$ 23,755,741,472	$ 23,755,741,472	$ -
	Funded Status ($): MVA - AAL	$ (13,477,860,890)	$ (13,477,860,890)	$ -
	Funded Status (%): MVA / AAL	63.80%	63.80%	0.00%
Contribution Rate:				
	Normal Cost (mid-year)	$ 987,255,055	$ 987,255,055	$ -
	Normal Cost Rate	21.97%	21.97%	0.00%
	Unfunded Liability Amortization (mid-year)	$ 421,162,139	$ 499,632,441	$ 78,470,302
	Unfunded Liability Amortization Rate	9.37%	11.12%	1.75%
	Annual Required Contribution	$ 1,408,417,194	$ 1,486,887,496	$ 78,470,302
	Annual Required Contribution Rate	31.34%	33.09%	1.75%

Economic Assumptions – Individual Salary Growth

Description

- The retirement benefits for the Plan are based upon a member's final average salary.
  - Salary is typically the highest in the final years of employment.
  - Estimating each member's benefit for the actuarial valuation requires us to project salary for future years of employment.
- The individual salary growth assumption consists of the following components:
  - Inflation
  - Productivity (real wage growth)
  - Merit and promotional increases
- Productivity, merit and promotional salary increases can be measured in aggregate by analyzing salary growth, net of inflation.
- Merit and promotional increases can be measured by further removing assumed real wage growth
- For Plan members, the cost of active health care insurance is included in the salary used for computing benefits.
  - Health care costs have been rising faster than salaries in general, so we have analyzed this component of salary separately.

Economic Assumptions – Individual Salary Growth

Current Assumption

- The current individual salary growth assumption is 5.00% in all years (3.25% inflation, plus 1.75% real wage growth), plus the service-based merit/promotional increases shown in the table below.
  - Note that salary increases resulting from the increase in health care insurance is not included in the rates shown below, as the impact of health care insurance is included in the 1.75% real wage growth assumption.

Service	Merit / Promotion Increases
0	7.00%
1	6.00%
2	4.50%
3	4.50%
4	4.50%
5	4.25%
6	4.00%
7	3.75%
8	3.50%
9	3.25%
10	3.00%
11	2.75%
12	2.50%
13	2.25%
14	2.00%
>=15	1.75%

Economic Assumptions – Individual Salary Growth

Experience and Analysis

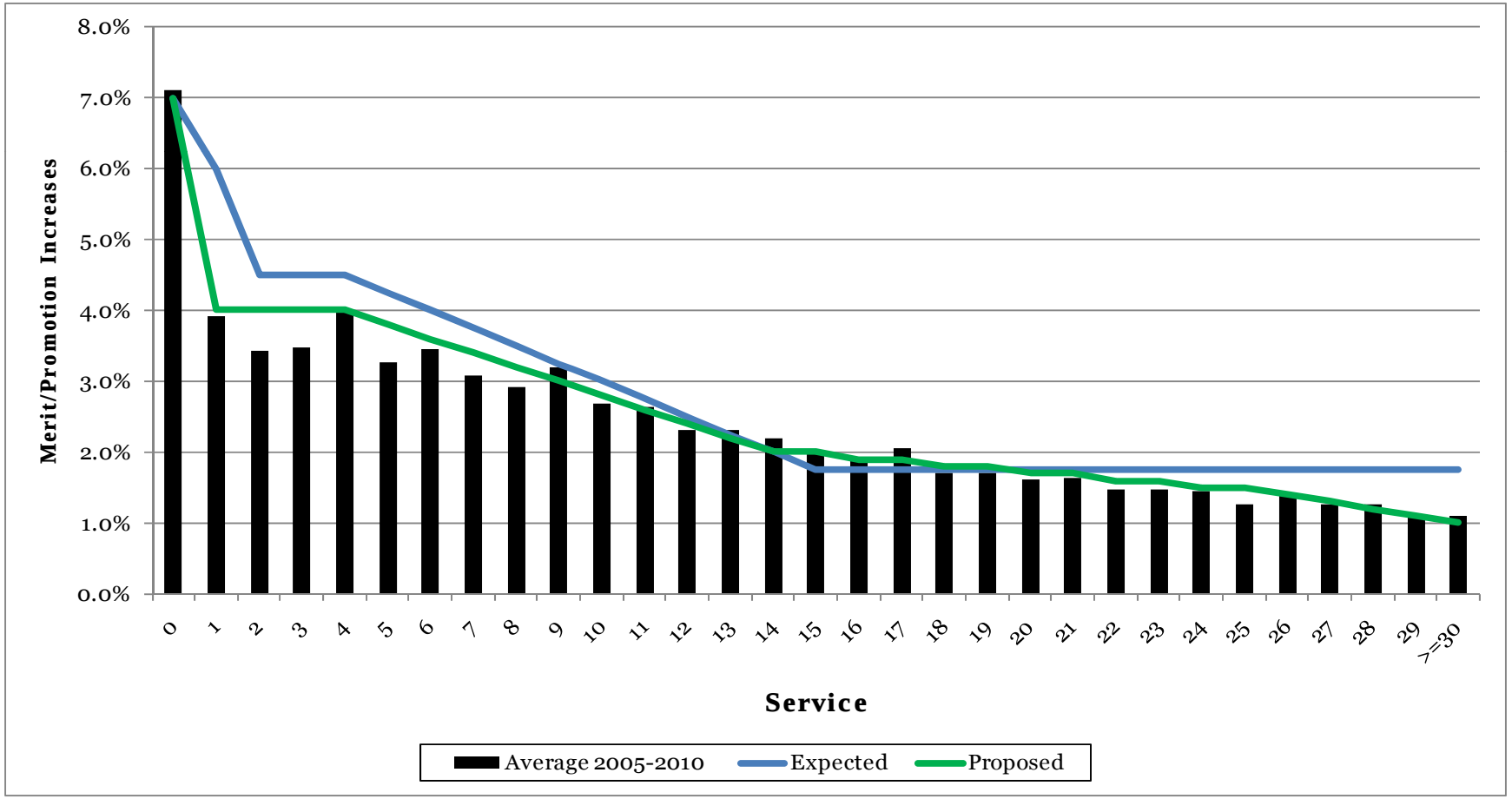
- The following table shows individual salary growth experience, net of inflation and the cost of active health care insurance (i.e. the cost of insurance was removed from salaries and the resulting annual increases shown are net of the increase in the CPI-U index).

	Productivity / Merit / Promotion Increase							
Service	Expected	Actual 2005-2006	Actual 2006-2007	Actual 2007-2008	Actual 2008-2009	Actual 2009-2010	Average 2005-2010	Proposed
0	7.00%	6.7%	7.0%	5.8%	11.3%	4.7%	7.1%	7.00%
1	6.00%	2.5%	4.3%	2.6%	7.5%	2.7%	3.9%	4.00%
2	4.50%	2.2%	3.5%	2.1%	7.2%	2.1%	3.4%	4.00%
3	4.50%	2.2%	3.6%	2.2%	7.1%	2.2%	3.5%	4.00%
4	4.50%	2.6%	4.1%	3.0%	7.7%	2.6%	4.0%	4.00%
5	4.25%	2.0%	3.3%	1.7%	7.0%	2.4%	3.3%	3.80%
6	4.00%	2.1%	3.6%	2.0%	6.9%	2.6%	3.5%	3.60%
7	3.75%	1.7%	3.2%	1.5%	6.7%	2.3%	3.1%	3.40%
8	3.50%	1.6%	3.3%	1.2%	6.4%	2.0%	2.9%	3.20%
9	3.25%	1.9%	3.3%	1.6%	6.8%	2.3%	3.2%	3.00%
10	3.00%	1.3%	2.8%	1.1%	6.3%	1.9%	2.7%	2.80%
11	2.75%	1.2%	3.0%	1.1%	6.1%	1.8%	2.6%	2.60%
12	2.50%	0.9%	2.6%	0.3%	5.9%	1.8%	2.3%	2.40%
13	2.25%	0.8%	2.4%	0.6%	6.1%	1.7%	2.3%	2.20%
14	2.00%	0.8%	2.3%	0.3%	6.1%	1.5%	2.2%	2.00%
15	1.75%	0.3%	2.3%	0.3%	6.1%	1.1%	2.0%	2.00%
16	1.75%	0.2%	2.1%	0.3%	5.7%	1.3%	1.9%	1.90%
17	1.75%	0.2%	2.0%	0.7%	5.7%	1.7%	2.1%	1.90%
18	1.75%	0.2%	1.9%	0.1%	4.9%	1.5%	1.7%	1.80%
19	1.75%	0.1%	1.8%	0.0%	5.5%	1.0%	1.7%	1.80%
20	1.75%	-0.1%	1.8%	0.1%	5.4%	0.9%	1.6%	1.70%
21	1.75%	0.1%	1.6%	0.1%	5.5%	0.7%	1.6%	1.70%
22	1.75%	0.3%	1.6%	-0.5%	5.2%	0.8%	1.5%	1.60%
23	1.75%	0.1%	1.8%	-0.4%	4.9%	0.9%	1.5%	1.60%
24	1.75%	0.1%	1.5%	-0.2%	5.0%	0.8%	1.4%	1.50%
25	1.75%	0.0%	1.2%	-0.3%	4.9%	0.6%	1.3%	1.50%
26	1.75%	-0.1%	1.5%	-0.1%	5.2%	0.5%	1.4%	1.40%
27	1.75%	0.2%	1.3%	-0.6%	4.9%	0.6%	1.3%	1.30%
28	1.75%	-0.3%	1.5%	-0.6%	5.2%	0.6%	1.3%	1.20%
29	1.75%	0.0%	1.1%	-0.7%	5.3%	0.0%	1.1%	1.10%
>=30	1.75%	-0.3%	1.3%	-0.8%	4.8%	0.7%	1.1%	1.00%

Economic Assumptions – Individual Salary Growth

Experience and Analysis (Cont.)

- The graph below compares the average annual increases from 2005-2010 due to productivity, merit, and promotion to the current and proposed assumptions.



Economic Assumptions – Individual Salary Growth

Summary

- Individual salary growth continues to be highly correlated to length of service, where member salaries grow faster (in percentage terms) in the early years of their careers.
- Percentage increases tend to slowly decline over 30 years, rather than 15 years as the current assumption would expect.
- The active health insurance component of salaries is growing faster than actual take home pay.
  - The cost of health insurance is about 8.7% of gross pay for Plan members in 2010 and recent health care trend has been about 5% per year. As such, we expect health care costs to become a larger portion of the gross pay over time.
  - As shown in the analysis of the payroll growth assumption, we expect rising insurance costs to add 0.50% to the real wage growth.
- Inflation, real wage growth, and the impact of health insurance premiums should be consistent with the total payroll growth assumption.

Economic Assumptions – Individual Salary Growth

Recommendation

- We recommend the salary increase assumption shown to the right.
  - Assumes inflation of 2.5% , consistent with the payroll growth assumption
  - Assumes that health care insurance costs account for 0.50% of real salary growth each year, consistent with the payroll growth assumption.
  - Assumes 0.50% additional real salary growth, which is included in the Productivity, Merit and Promotion component of the total salary growth assumption shown to the right.

Service	Inflation	Health Care Insurance	Productivity, Merit, and Promotion	Total Individual Salary Growth
0	2.50%	0.50%	7.00%	10.00%
1	2.50%	0.50%	4.00%	7.00%
2	2.50%	0.50%	4.00%	7.00%
3	2.50%	0.50%	4.00%	7.00%
4	2.50%	0.50%	4.00%	7.00%
5	2.50%	0.50%	3.80%	6.80%
6	2.50%	0.50%	3.60%	6.60%
7	2.50%	0.50%	3.40%	6.40%
8	2.50%	0.50%	3.20%	6.20%
9	2.50%	0.50%	3.00%	6.00%
10	2.50%	0.50%	2.80%	5.80%
11	2.50%	0.50%	2.60%	5.60%
12	2.50%	0.50%	2.40%	5.40%
13	2.50%	0.50%	2.20%	5.20%
14	2.50%	0.50%	2.00%	5.00%
15	2.50%	0.50%	2.00%	5.00%
16	2.50%	0.50%	1.90%	4.90%
17	2.50%	0.50%	1.90%	4.90%
18	2.50%	0.50%	1.80%	4.80%
19	2.50%	0.50%	1.80%	4.80%
20	2.50%	0.50%	1.70%	4.70%
21	2.50%	0.50%	1.70%	4.70%
22	2.50%	0.50%	1.60%	4.60%
23	2.50%	0.50%	1.60%	4.60%
24	2.50%	0.50%	1.50%	4.50%
25	2.50%	0.50%	1.50%	4.50%
26	2.50%	0.50%	1.40%	4.40%
27	2.50%	0.50%	1.30%	4.30%
28	2.50%	0.50%	1.20%	4.20%
29	2.50%	0.50%	1.10%	4.10%
>=30	2.50%	0.50%	1.00%	4.00%

Economic Assumptions – Individual Salary Growth

Impact

- The table below shows the impact of revising the individual salary growth assumption.
  - The impact analysis below is as of 6/30/2010, the date of the last actuarial valuation. A similar impact would be expected at 6/30/2011.

		Baseline	Individual Salary Increases	Increase / (Decrease)
Funded Status:				
	Actuarial Accrued Liability (AAL)	$ 37,233,602,362	$ 36,918,691,179	$ (314,911,183)
	Actuarial Value of Assets (AVA)	$ 28,931,330,978	$ 28,931,330,978	$ -
	Funded Status ($): AVA - AAL	$ (8,302,271,384)	$ (7,987,360,201)	$ 314,911,183
	Funded Status (%): AVA / AAL	77.70%	78.36%	0.66%
	Market Value of Assets (MVA)	$ 23,755,741,472	$ 23,755,741,472	$ -
	Funded Status ($): MVA - AAL	$ (13,477,860,890)	$ (13,162,949,707)	$ 314,911,183
	Funded Status (%): MVA / AAL	63.80%	64.35%	0.55%
Contribution Rate:				
	Normal Cost (mid-year)	$ 987,255,055	$ 931,222,245	$ (56,032,810)
	Normal Cost Rate	21.97%	20.72%	(1.25%)
	Unfunded Liability Amortization (mid-year)	$ 421,162,139	$ 405,215,629	$ (15,946,510)
	Unfunded Liability Amortization Rate	9.37%	9.02%	(0.35%)
	Annual Required Contribution	$ 1,408,417,194	$ 1,336,437,875	$ (71,979,319)
	Annual Required Contribution Rate	31.34%	29.74%	(1.60%)

Economic Assumptions – Expected Return on Assets

Description

- The long-term expected rate of return on assets is the average rate of return that is expected to be realized on the funds contributed to the system to pay benefits and is ultimately a function of the policy adopted for investing the monies contributed by members and employers to fund the benefit liabilities.
- The expected return on assets is the interest rate that is used to calculate the present value of the benefit liabilities in the actuarial valuation.
- The expected return on assets is typically derived by weighting the expected returns of each type or class of security to which funds are allocated and invested.
  - The expected investment return of any financial security includes the following components:
    - Inflation
    - Risk-free real returns
    - Risk premium
- Past investment experience is generally not a good predictor of future performance, given the volatility of the financial markets and other factors that can significantly impact the financial markets.
- The advice and expectations of professional asset managers are generally sought to help in developing the asset return assumption.

Economic Assumptions – Expected Return on Assets

Current Assumption

- The current expected return on assets assumption is 8.00% annually, net of administrative and investment expenses.

Experience and Analysis

- It is our understanding that your asset advisor will perform an asset/liability study and will independently provide their analysis concerning the expected return assumption. As such, we will defer to their expertise regarding the development of this assumption.

Impact

- If the asset advisor's analysis prompts a change in the expected return assumption, PwC will compute the impact the change will have on liabilities and contribution rates.

Economic Assumptions – COLA

Description

- The cost-of-living adjustment, or COLA, assumption is the annual increase in retirement benefits expected to be granted to retirees while in receipt of their retirement benefits.
  - There is currently an 80% statutory limit on the total lifetime COLA increase that any particular member may receive while in payment.
  - New retirees begin receiving cost-of-living adjustments on the 2nd January after commencing benefits.
- COLAs are granted to retirees in order to preserve their purchasing power against inflation.
- Historically, annual increases in the CPI-U index were relied upon heavily in determining the COLA granted by the Board.
  - Statutes currently restrict the Board's discretion in granting COLAs, based on the CPI-U index:
    - If CPI-U is flat or decreases, COLA =0%
    - If CPI-U increase is greater than 0%, but less than 2%, COLA must be between 0% and 5%
    - If CPI-U increase is at least 2%, but less than 5%, COLA must be at least 2%, but not greater than 5%
    - If CPI-U increase is greater than 5%, COLA must be at least 5%

Economic Assumptions – COLA

Current Assumption

- The current COLA assumption is equal to the current inflation assumption of 3.25%

Experience and Analysis

- Refer to the analysis of the inflation assumption.

Recommendation

- We recommend lowering the COLA assumption to no higher than 2.50%, consistent with the inflation assumption.

Economic Assumptions – COLA

Impact

- The table below shows the impact of lowering the COLA assumption from 3.25% to 2.50%.
  - The impact analysis below is as of 6/30/2010, the date of the last actuarial valuation. A similar impact would be expected at 6/30/2011.

		Baseline	Cost-of-Living Adjustments (2.5%)	Increase / (Decrease)
Funded Status:				
	Actuarial Accrued Liability (AAL)	$ 37,233,602,362	$ 35,841,991,755	$ (1,391,610,607)
	Actuarial Value of Assets (AVA)	$ 28,931,330,978	$ 28,931,330,978	$ -
	Funded Status ($): AVA - AAL	$ (8,302,271,384)	$ (6,910,660,777)	$ 1,391,610,607
	Funded Status (%): AVA / AAL	77.70%	80.72%	3.02%
	Market Value of Assets (MVA)	$ 23,755,741,472	$ 23,755,741,472	$ -
	Funded Status ($): MVA - AAL	$ (13,477,860,890)	$ (12,086,250,283)	$ 1,391,610,607
	Funded Status (%): MVA / AAL	63.80%	66.28%	2.48%
Contribution Rate:				
	Normal Cost (mid-year)	$ 987,255,055	$ 944,995,708	$ (42,259,348)
	Normal Cost Rate	21.97%	21.03%	(0.94%)
	Unfunded Liability Amortization (mid-year)	$ 421,162,139	$ 350,693,597	$ (70,468,542)
	Unfunded Liability Amortization Rate	9.37%	7.80%	(1.57%)
	Annual Required Contribution	$ 1,408,417,194	$ 1,295,689,305	$ (112,727,889)
	Annual Required Contribution Rate	31.34%	28.83%	(2.51%)

Summary

- Based on the Plan's experience and current market conditions, we recommend changes to most of the current actuarial assumptions.
- Demographic Assumptions:
  - Past experience tends to be a good indicator of future demographic experience.
  - Most recommended changes to the demographics assumptions would have a small impact on the total liability of the system and the calculation of the contribution rate.
    - The mortality assumption is the one exception. The current assumption appears to be too conservative, based on the experience.
- Economic Assumptions:
  - Expert forecasts and observable expectations of future economic activity are more heavily relied upon for setting economic assumptions than past experience.
  - Recommended changes to the economic assumptions would have a larger impact on the system, though most of the changes produce a favorable result (i.e. lower liabilities and contribution rates)
  - Economic expectations have changed significantly since the prior experience study.

Summary

- Economic Assumptions (Cont.):
  - Inflation is a component of all economic assumptions, so a decrease in the inflation assumption results in a decrease to other economic assumptions, such as payroll growth, individual salary growth, cost-of-living adjustments, etc.
  - The outlook for real wage growth has decreased in recent years.
- Summary of Recommended Changes:
  - **Mortality**: Change from 1994 GAM table with setbacks and adjustments to the RP 2000 table with additional setbacks, then projected (using Scale AA) to 2016.
  - **Retirement**: Slight changes to reflect less retirement upon first eligibility for the rule-of-80, and greater retirement at 31 years of service through 6/30/2013 and 30 years of service after 6/30/2013.
  - **Disability**: Slight increases in the likelihood of retirement at most ages.
  - **Refunds**: Decrease the percentage of vested terminated members who elect a refund of contributions, as opposed to a deferred annuity benefit, from 30% to 12%.
  - **Service Purchases**: Add a 2.00% load to the normal cost each year to anticipate losses generated from service purchases and reinstatements.

Summary

- Summary of Recommended Changes (Cont.):
  - **Dependent Assumptions**:
    - Change the percent married assumptions to assume 80% of all male members and 70% of all female members are married.
    - Change the assumed age difference to assume that members (male or female) are 4 years older than their spouses.
    - Update the assumed value of benefits payable to child beneficiaries upon death to be an age-based table to reflect that older members are likely to have older children.
  - **Inflation**: Reduce the inflation assumption from 3.25% to 2.50%
  - **Payroll Growth**: Reduce the payroll growth assumption from 5.00% to 3.50% (consisting of 2.50% inflation, 0.50% real wage growth, and 0.50% growth due to the inclusion of active health insurance costs in gross salary).
  - **Individual Salary Growth**: Reduce the age-based salary growth assumptions to reflect the reductions in the inflation and real wage growth assumptions, along with slightly lower merit and promotional increases.
  - **Expected Return on Assets**: Wait for the result of Actuary ABC's asset/liability study for analysis concerning the expected return assumption.
  - **Cost-of-Living Adjustments**: Lower the COLA assumption from 3.25% to no more than 2.50%.

Summary

- The table below shows the total impact of instituting all of the assumptions recommended in this experience study, including a 2.50% COLA assumption.
  - The impact analysis below is as of 6/30/2010, the date of the last actuarial valuation. A similar impact would be expected at 6/30/2011.
  - The impacts of each individual assumption recommendation shown previous are not additive and therefore will not match the total impact illustrated below if summed.

	Baseline	All Proposed Assumptions	Increase / (Decrease)
Funded Status:			
Actuarial Accrued Liability (AAL)	$ 37,233,602,362	$ 34,566,244,195	$ (2,667,358,167)
Actuarial Value of Assets (AVA)	$ 28,931,330,978	$ 28,931,330,978	$ -
Funded Status ($): AVA - AAL	$ (8,302,271,384)	$ (5,634,913,217)	$ 2,667,358,167
Funded Status (%): AVA / AAL	77.70%	83.70%	6.00%
Market Value of Assets (MVA)	$ 23,755,741,472	$ 23,755,741,472	$ -
Funded Status ($): MVA - AAL	$ (13,477,860,890)	$ (10,810,502,723)	$ 2,667,358,167
Funded Status (%): MVA / AAL	63.80%	68.73%	4.93%
Contribution Rate:			
Normal Cost (mid-year)	$ 987,255,055	$ 881,496,763	$ (105,758,292)
Normal Cost Rate	21.97%	19.62%	(2.35%)
Unfunded Liability Amortization (mid-year)	$ 421,162,139	$ 339,334,843	$ (81,827,296)
Unfunded Liability Amortization Rate	9.37%	7.55%	(1.82%)
Annual Required Contribution	$ 1,408,417,194	$ 1,220,831,607	$ (187,585,587)
Annual Required Contribution Rate	31.34%	27.17%	(4.17%)

Appendix 1 – Additional Assumption Considerations

- Optional Form of Payment Election
- Return of Unused Employee Contributions
- Interest on Member Contributions
- Missing/Incomplete Data Assumptions
- Updating Internal Calculation Files

Optional Form of Payment Election

Description

- Members may choose from a number of optional annuity payment forms upon commencement of benefit (e.g. life annuity, certain and life annuity, joint and survivor annuity).
- Plan staff compute the monthly payment the member would receive from each option.

Current Assumption

- Apply a 0.4% load to all liabilities except disability and refunds to recognize the subsidy in the joint and survivor reduction factors calculated without provision for cost-of-living adjustments.

Consideration

- If the internal conversion calculations do not incorporate the valuation assumptions precisely, consider including in the valuation a corresponding liability load.
  - For example, if the annuity conversion calculations ignore the COLA, monthly payments to the members would be greater than anticipated in the valuation.

Optional Form of Payment Election

Recommendation

- No change to the 0.4% load.
- PwC will work with Plan staff to adjust the current assumption if/when the internal calculations are updated for assumption changes.

Return of Unused Employee Contributions

Description

- The value of member contributions are tracked/accumulated during their careers.
- Retirement benefits received by the member cannot be less than the value of their accumulated contributions.
- Data regarding accumulated member contributions is often not provided after members retire.

Current Assumption

- Assume it takes member 5 years of benefit payments to exceed the value of their accumulated contributions plus interest (i.e. value active retirement benefits as 5-year certain and life annuity).

Consideration

- The approximate length of time required for annuity payments to equal the accumulated contributions could change over time as demographics and contribution rates change.

Recommendation

- PwC will continue to monitor and update the current assumption as needed.

Interest on Member Contributions

Description

- Member contributions are credited with interest while they remain in the fund.
- The interest rate credited is comparable to a money-market account or risk-free investment.

Current Assumption

- The current assumed interest crediting rate on member contributions is 2%.

Consideration

- The rate of return for risk-free savings vehicles fluctuates based on economic conditions.
- 2% is a reasonable long-term approximation at this time.
- The interest crediting rate has very little impact on the liabilities of the system.
  - Those most likely to take a refund of their contributions have little service and therefore, have accumulated little interest on their contributions.

Recommendation

- No change at this time. PwC will re-assess the assumption periodically and notify Plan staff and the Board if/when a change should be considered.

Missing/Incomplete Data Assumptions

Description

- Each year there are data records that are missing or have incomplete required data fields such as date of birth, beneficiary date of birth, beneficiary sex, payment form, etc.

Current Assumption

- Date of birth – assume average age of population
- Gender – assume female
- Pensionable pay for members who did not earn service in the last year – assume greater of (i) current year salary, (ii) prior year salary, and (iii) $10,000
- Pensionable pay for members who did earn service in the last year – assume greater of (i) annualized pay and (ii) $10,000
- Beneficiary gender – assume opposite of member (if none present, assume male)
- Optional benefit form – assume single life annuity

Missing/Incomplete Data Assumptions

Consideration

- These assumptions change as the demographic of the members change and as ABC improves data quality and tracking.

Recommendation

- PwC will continue to apply reasonable methods for filling in missing/incomplete data that is needed for the annual valuations.
- If the impact of these assumptions were to have any sort of impact on contribution rates, PwC would promptly notify ABC staff and the Board.

Updating Internal Calculation Files

Description

- ABC Retirement System has a set of internal calculation files used to determine actuarially equivalent benefit amounts for various situations.

Consideration

- If any of the assumptions that affect these calculation files are revised due to this experience study, consider having PwC review and update those calculation files.

This document was not intended or written to be used, and it cannot be used, for the purpose of avoiding U.S. federal, state, or local tax penalties. This includes penalties that may apply if the transaction that is the subject of this document is found to lack economic substance or fails to satisfy any other similar rule of law. This document has been prepared pursuant to an engagement letter between ABC Retirement System and PwC, and is intended solely for the use and benefits of ABC Retirement System and not for reliance by any other person.

Appendix C – Sample Benefit Cost Estimate Report

[Date]

Board of Trustees
ABC Retirement System
Address
City, State Zip Code

Re: ABC Retirement System – Fiscal Impact of 13th Check or Cost-of-Living Adjustment

Dear Board of Trustees,

As requested and pursuant to our engagement letter dated [month day, year], we have estimated the cost of the proposed benefit changes to the ABC Retirement System described in [Legislative Proposal] as of June 30, 2013.

Proposed Changes:

[Legislative Proposal] provides a one-time, permanent adjustment to the benefit of an ABC Retirement System member (or to a survivor or beneficiary of an ABC Retirement System member) that is retired or disabled before January 1, 2014. A six-step formula is detailed in the text of [Legislative Proposal] for determining the amount of the one-time, permanent adjustment to the annual benefit paid. The six-step formula ultimately adds together two separate benefit amounts for determining the total benefit adjustment. The two benefit amounts are as follows:

- **Benefit 1:** Ten dollars ($10) multiplied by the number of years of creditable service used to compute the member's retirement benefit.

- **Benefit 2:** The product of (1) and (2):
  1. The monthly benefit (including postretirement increases to the monthly benefit) provided by employer contributions payable to the member as of January 1, 2014, multiplied by twelve (12), and
  2. A percentage, as applicable, equal to:
     a) One percent (1%), if the member retired after December 31, 1994, or
     b) Two percent (2%), if the member retired after December 31, 1982, and before January 1, 1995, or
     c) Three percent (3%), if the member retired before January 1, 1983

* The values of Benefit 1 and Benefit 2 described above are computed on an annual basis. Each benefit adjustment should be divided by twelve (12) to determine the increase to the monthly pension benefit.

The scenarios below were computed to quantify the fiscal impact of [Legislative Proposal]. As discussed with the ABC Retirement System, we have assumed the increase in benefit provided by [Legislative Proposal] would take effect on January 1, 2015 to be consistent with past timing of benefit increases.

- **BASELINE:** The June 30, 2013 valuation results, which reflect assumed COLAs of 1% on January 1, 2015 and all subsequent years.

- **Alternate BASELINE:** The June 30, 2013 valuation results modified to remove the assumed 1.0% COLA on January 1, 2015. A 1% COLA is assumed for January 1, 2016 and all future years.

- **Benefit 1:** The June 30, 2013 valuation results modified to increase the annual benefit for each member (or survivor or beneficiary of a member) that is retired or disabled as of January 1, 2014 by an amount depending on the member's service at retirement. This increase is in lieu of the 1% COLA on January 1, 2015 assumed in the BASELINE scenario and in lieu of no COLA on January 1, 2015 assumed in the Alternate BASELINE

scenario.

- **Benefit 2:** The June 30, 2013 valuation results modified to increase the annual benefit for each member (or survivor or beneficiary of a member) that is retired or disabled as of January 1, 2014 by an amount depending on the member's monthly employer provided pension benefit as of January 1, 2014. This increase is in lieu of the 1% COLA on January 1, 2015 assumed in the BASELINE scenario and in lieu of no COLA on January 1, 2015 assumed in the Alternate BASELINE scenario.

- **Benefit 1 + Benefit 2:** The results of the "Benefit 1" and "Benefit 2" scenarios are aggregated.

The table below summarizes the estimated impact to the Present Value of Future Benefits ("PVFB") under each of the scenarios described above. Detailed estimates of the fiscal impact are presented in the enclosed exhibits. Note that the BASELINE (June 30, 2013 valuation) results assume a 1% COLA is provided on January 1, 2015. The Alternate BASELINE results assume no COLA is provided on January 1, 2015. Therefore, our estimate of the true economic cost of Benefit 1 and Benefit 2 is illustrated by the change in PVFB when compared to the Alternate BASELINE.

	Change in PVFB compared to	
Scenario	**BASELINE**	**Alternate BASELINE**
Benefit 1	($79,044)	$507,413
Benefit 2	($92,810)	$493,647
Benefit 1 + Benefit 2	$414,603	$1,001,060

The PVFB represents the present value (as of June 30, 2013) of all benefits expected to be paid to members of the ABC Retirement System. This includes benefits that have been earned through service accrued to date and benefits that will be earned through future service. As shown in the enclosed exhibits, a change in PVFB typically affects future contribution rates due to a change in future normal costs as well as a 30-year amortization of the change in accrued liability.

Please note the following when reviewing the results:

- All results are based on June 30, 2013 member data, assets, plan provisions (other than the modifications noted herein), and the actuarial assumptions and methods used for the June 30, 2013 actuarial valuations. This includes a 13th check approved by the legislature and provided to ABC Retirement System members in place of a 1% COLA effective January 1, 2014. Summaries of these items can be found in our valuation report dated [month day, year]. Modifications to the assumptions for quantifying the fiscal impact of each scenario are noted in Exhibit III. Actual costs will differ based on demographic experience as well as how closely actual COLAs compare to the assumptions selected by ABC Retirement System for this cost analysis.

- We have estimated the impact of the proposed benefit changes using a measurement date of June 30, 2013, since the most recent member data provided for each plan is as of that date.

- Our analysis was performed based on our understanding of the current ABC Retirement System benefit provisions as set forth in the respective Code, and the amendments to these provisions proposed in [Legislative Proposal]. Please let us know if you believe any aspect of our analysis is not in accordance with your understanding as this may impact our results.

- Our analysis does not include any additional administrative cost that may be incurred by ABC Retirement System staff to implement this change.

Please call with any questions or if you require additional information.

Sincerely,

Cindy Fraterrigo, FSA, EA, MAAA

Brandon Robertson, ASA, EA, MAAA

cc: [add copied recipients]

	BASELINE June 30, 2013 Valuation	Alternate BASELINE No January 1, 2015 1% COLA	Benefit 1	Benefit 2	Benefit 1 + Benefit 2
Assumed COLA Percentage					
January 1, 2015	1.00%	0.00%	Member specific	Member specific	Member specific
Subsequent years	1.00%	1.00%	1.00%	1.00%	1.00%
Liabilities and Funded Status					
Present Value of Future Benefits					
Active / Inactive Vested Members	$ 93,600,000	$ 93,500,000	$ 93,500,000	$ 93,500,000	$ 93,600,000
Member Contribution Balances	7,500,000	7,500,000	7,500,000	7,500,000	7,500,000
Retired / Disabled / Beneficiary Members	56,000,000	55,500,000	56,000,000	56,000,000	56,400,000
Total	$ 157,100,000	$ 156,500,000	$ 157,000,000	$ 157,000,000	$ 157,500,000
Difference from BASELINE		**$ (600,000)**	**$ (100,000)**	**$ (100,000)**	**$ 400,000**
Difference from Alternate BASELINE			**$ 500,000**	**$ 500,000**	**$ 1,000,000**
Actuarial Accrued Liability					
Active / Inactive Vested Members	$ 54,600,000	$ 54,600,000	$ 54,600,000	$ 54,600,000	$ 54,700,000
Member Contribution Balances	7,500,000	7,500,000	7,500,000	7,500,000	7,500,000
Retired / Disabled / Beneficiary Members	56,000,000	55,500,000	56,000,000	56,000,000	56,400,000
Total	$ 118,100,000	$ 117,600,000	$ 118,100,000	$ 118,100,000	$ 118,600,000
Difference from BASELINE		**$ (500,000)**	**$ -**	**$ -**	**$ 500,000**
Difference from Alternate BASELINE			**$ 500,000**	**$ 500,000**	**$ 1,000,000**
Actuarial Value of Assets	$ 98,600,000	$ 98,600,000	$ 98,600,000	$ 98,600,000	$ 98,600,000
Unfunded Actuarial Accrued Liability (UAAL)	$ 19,500,000	$ 19,000,000	$ 19,500,000	$ 19,500,000	$ 20,000,000
Funded Status	83.5%	83.8%	83.5%	83.5%	83.1%
Development of Annual Required Contribution Rate					
Anticipated Payroll	$ 26,200,000	$ 26,200,000	$ 26,200,000	$ 26,200,000	$ 26,200,000
Normal Cost	$ 3,800,000	$ 3,800,000	$ 3,800,000	$ 3,800,000	$ 3,800,000
Normal Cost Rate	14.50%	14.50%	14.50%	14.50%	14.50%
UAAL Amortization	$ 1,500,000	$ 1,500,000	$ 1,500,000	$ 1,500,000	$ 1,600,000
UAAL Amortization Rate	5.73%	5.73%	5.73%	5.73%	6.11%
Expected Employee Contributions	$ 1,000,000	$ 1,000,000	$ 1,000,000	$ 1,000,000	$ 1,000,000
Expected Employee Contribution Rate	3.82%	3.82%	3.82%	3.82%	3.82%
Total Employer Cost	$ 4,300,000	$ 4,300,000	$ 4,300,000	$ 4,300,000	$ 4,300,000
Employer Contribution Rate	16.41%	16.41%	16.41%	16.41%	16.41%

Notes

1. The Present Value of Future Benefits, Actuarial Accrued Liability and Normal Cost for all members was based on census data as of the June 30, 2013 valuation.
2. The Actuarial Value of Assets was based on asset information as of June 30, 2013.
3. The results above reflect the assumptions and methods shown in Exhibit III.
4. The Annual Required Contribution Rates shown above represent the true cost of the plan under each scenario and are not indicative of the actual contribution rates that have been or will be approved by the ABC Retirement System Board.

This report has been prepared pursuant to the engagement letter between PricewaterhouseCoopers LLP and the ABC Retirement System, dated [month day, year], and is intended solely for the use and benefit of the ABC Retirement System and not for reliance by any other person.

In preparing the results presented in this exhibit, we have relied upon information the ABC Retirement System provided to us regarding plan assets, plan provisions, and plan participants. While the scope of our engagement did not call for us to perform an audit or independent verification of this information, we have reviewed this information for reasonableness. The accuracy of the results presented in this report is dependent upon the accuracy and completeness of the underlying information.

To the best of our knowledge, the individuals involved in this engagement have no relationship that may impair or appear to impair the objectivity of our work.

No statement in this letter is intended as a recommendation in favor, or in opposition, of the proposed legislation. Except as otherwise noted, potential impacts on other benefit plans were not considered.

The calculations are based upon assumptions regarding future events. However, the plan's long term costs will be determined by actual future events, which may differ materially from the assumptions that were made. The calculations are also based upon present and proposed plan provisions that are outlined in the letter. If you have reason to believe that the assumptions that were used are unreasonable, that the plan provisions are incorrectly described, that important plan provisions relevant to this proposal are not described, or that conditions have changed since the calculations were made, you should contact the author of this letter prior to relying on information in the letter.

If you have reason to believe that the information provided in this letter is inaccurate, or is in any way incomplete, or if you need further information in order to make an informed decision on the subject matter of this letter, please contact the author of the letter prior to making such decision.

In the event that more than one plan change is being considered, it is very important to remember that the results of separate actuarial valuations cannot generally be added together to produce a correct estimate of the combined effect of all of the changes. The total can be considerably greater or less than the sum of the parts due to the interaction of various plan provisions with each other, and with the assumptions that must be used.

This document was not intended or written to be used, and it cannot be used, for the purpose of avoiding U.S. federal, state or local tax penalties. This includes penalties that may apply if the transaction that is the subject of this document is found to lack economic substance or fails to satisfy any other similar rule of law. This document has been prepared pursuant to an engagement between PricewaterhouseCoopers LLP and the ABC Retirement System and is intended solely for the use and benefit of the ABC Retirement System and not for reliance by any other person.

Summary of Actuarial Assumptions, Methods and Provisions