

January 8, 2016

# Commonwealth of Pennsylvania

Technical Submittal in Response to  
RFP # SERS 2015-028 for Actuarial Services and  
Pension Plan Consulting for the State Employees'  
Retirement System

HayGroup®



***Prepared by:***

Hay Group  
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January 8, 2016

Pennsylvania State Employees' Retirement System  
Attn: Joshua D. Smith  
30 North Third Street, Suite 150  
Harrisburg, PA 17101-1716

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Re: Hay Group Actuarial/Pension Consulting Proposal in Response to RFP SERS 2015-028

Dear Mr. Smith:

Enclosed you will find (i) eight (8) separately sealed paper copies of our Technical Submittal (each including an Appendix of other relevant information for your consideration), (ii) two (2) paper copies of our Cost Submittal (separately sealed from the Technical Submittals), (iii) two (2) paper copies of our Small Diverse Business (SDB) Participation Submittal (separately sealed from both the Technical Submittals and Cost Submittals) and (iv) one Flash Drive, which contains a complete and exact copy of Hay Group's entire proposal, in response to your December 4, 2015 request for proposal to provide actuarial services and pension plan consulting for the Pennsylvania State Employees' Retirement System (SERS). We have also enclosed, in each of the separate envelopes that contain a copy of our Technical Submittal, the following:

- A copy of our completed and signed (and witnessed) Domestic Workforce Utilization Certification and
- A copy of Addendum 1 – Responses to Questions, to document our receipt thereof.

Also, attached to this letter is our completed and signed Proposal Cover Sheet, signed by Mr. Kurt Fichthorn, the leader of Hay Group's Benefits consulting practice, who is authorized to act on behalf of Hay Group.

Please note the following:

- Our proposal will remain valid for a minimum of one-hundred twenty (120) calendar days from the deadline for proposal submission, or until a contract is executed, whichever is longer.
- The name and version number of the virus scanning software used to scan our Flash Drive before it was submitted are: Microsoft's System Center Endpoint Protection, Engine Version 1.1.12400.0

Please do not hesitate to contact me at (703) 841-3109 if you have any questions.

Sincerely,

Brent M. Mowery  
Senior Principal  
Enclosures

**PROPOSAL COVER SHEET  
COMMONWEALTH OF PENNSYLVANIA  
STATE EMPLOYEES' RETIREMENT SYSTEM  
RFP# SERS 2015-028**

**Enclosed in three separately sealed submittals is the proposal of the Offeror identified below for the above-referenced RFP:**

<b>Offeror Information:</b>	
Offeror Name	Hay Group
Offeror Mailing Address	4301 North Fairfax Drive, Suite 600 Arlington, VA 22203
Offeror Website	<a href="http://www.haygroup.com">www.haygroup.com</a>
Offeror Contact Person	Brent Mowery
Contact Person's Phone Number	703.841.3109
Contact Person's Facsimile Number	703.841.3108
Offeror Person's E-Mail Address	brent.mowery@haygroup.com
Offeror Federal ID Number	██████████
Offeror SAP/SRM Vendor Number	166616-001

<b>Submittals Enclosed and Separately Sealed:</b>	
<input checked="" type="checkbox"/>	Technical Submittal
<input checked="" type="checkbox"/>	Small Diverse Business Participation Submittal
<input checked="" type="checkbox"/>	Cost Submittal

<b><i>Signature</i></b>	
Signature of an official authorized to bind the Offeror to the provisions contained in the Offeror's proposal:	
Printed Name	Kurt H. Fichthorn
Title	Vice President

**FAILURE TO COMPLETE, SIGN AND RETURN THIS FORM WITH THE OFFEROR'S PROPOSAL MAY RESULT IN THE REJECTION OF THE OFFEROR'S PROPOSAL**

**DOMESTIC WORKFORCE UTILIZATION CERTIFICATION**

To the extent permitted by the laws and treaties of the United States, each proposal will be scored for its commitment to use the domestic workforce in the fulfillment of the contract. Maximum consideration will be given to those Contractors who will perform the contracted direct labor exclusively within the geographical boundaries of the United States or within the geographical boundaries of a country that is a party to the World Trade Organization Government Procurement Agreement. Those who propose to perform a portion of the direct labor outside of the United States and not within the geographical boundaries of a party to the World Trade Organization Government Procurement Agreement will receive a correspondingly smaller score for this criterion. In order to be eligible for any consideration for this criterion, Contractors must complete and sign the following certification. This certification will be included as a contractual obligation when the contract is executed. Failure to complete and sign this certification will result in no consideration being given to the Contractor for this criterion.

I, Vice President [title] of Hay Group [name of Contractor] a Delaware [place of incorporation] corporation or other legal entity, ("Contractor") located at 4301 North Fairfax Drive, Suite 600, Arlington, VA 22203 [address], having a Social Security or Federal Identification Number of [REDACTED], do hereby certify and represent to the Commonwealth of Pennsylvania ("Commonwealth") (Check **one** of the boxes below):

All of the direct labor performed within the scope of services under the contract will be performed exclusively within the geographical boundaries of the United States or one of the following countries that is a party to the World Trade Organization Government Procurement Agreement: Aruba, Austria, Belgium, Bulgaria, Canada, Chinese Taipei, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hong Kong, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Liechtenstein, Lithuania, Luxemburg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Singapore, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, and the United Kingdom

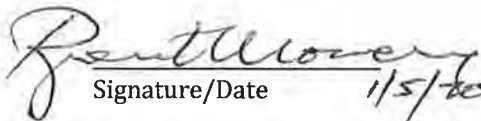
OR

                     percent (      %) [Contractor must specify the percentage] of the direct labor performed within the scope of services under the contract will be performed within the geographical boundaries of the United States or within the geographical boundaries of one of the countries listed above that is a party to the World Trade Organization Government Procurement Agreement. Please identify the direct labor performed under the contract that will be performed outside the United States and not within the geographical boundaries of a party to the World Trade Organization Government Procurement Agreement and identify the country where the direct labor will be performed: \_\_\_\_\_


\_\_\_\_\_  
[Use additional sheets if necessary]

The State Employees' Retirement System shall treat any misstatement as fraudulent concealment of the true facts punishable under Section 4904 of the *Pennsylvania Crimes Code*, Title 18, of Pa. Consolidated Statutes.

Attest or Witness:

  
Signature/Date 11/5/2016

Brent Mowery/Senior Principal  
Printed Name/Title

Hay Group  
Corporate or Legal Entity's Name  
 11/4/2016  
Signature/Date

Kurt H. Fichthorn/Vice President  
Printed Name/Title



**SOLICITATION ADDENDUM**

Date: **December 22, 2015**  
Subject: **Responses to Questions**  
Solicitation Number: **SERS 2015-028**  
Due Date/Time: **January 8, 2015 4:30 PM**  
Addendum Number: **1**

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To All Suppliers:

The Commonwealth of Pennsylvania defines a solicitation "Addendum" as an addition to or amendment of the original terms, conditions, specifications, or instructions of a procurement solicitation (e.g., Invitation for Bids or Request for Proposals).

*List any and all changes:*

Please see the attached document containing all questions and responses received that were submitted on or before the December 15, 2015 deadline.

Type of Solicitation: Electronic Bid (SRM) - Review the Questions section of your solicitation response to ensure you have responded, as required, to any questions relevant to solicitation addenda issued subsequent to the initial advertisement of the solicitation opportunity.

Except as clarified and amended by this Addendum, the terms, conditions, specifications, and instructions of the solicitation and any previous solicitation addenda, remain as originally written.

Respectfully,

Name: Joshua D. Smith  
Title: Management Analyst 2  
Phone: 717-237-0327  
Email: smjoshua@pa.gov

**QUESTIONS / ANSWERS  
ACTUARIAL SERVICES AND PENSION PLAN CONSULTING  
SERS 2015-028**

Question #	RFP Page # (if Known)	RFP Section Reference (if Known)	Question (Required)	Answer (Required)
1	16	Part I-12	How many paper copies of the Cost Submittal do you require?	Two copies of the Cost Submittal (placed in one separately sealed envelope as stated in the RFP instructions) will be sufficient in responding to the RFP requirements.
2	N/A	N/A	What were the fixed and variable fees paid to the current actuary over the last 5 years?	At the present time, fees paid to the current actuary have totaled approximately \$1,792,649.48 that includes \$353,124.93 in fixed fees and \$1,439,524.55 in variable fees. This amount represents work performed from 7/1/2011 - 11/15/2015.
3	N/A	N/A	What percentage of the work for the current contract is performed by a Small Diverse Business?	The current contract does not utilize a Small Diverse Business component.
4	16	Part I-12	Please clarify how many paper copies of the Cost Submittal are to be submitted?	Please see the response to Question 1 above for the response to this question.
5	36	Part V-23	Please confirm that V.23 CONTRACT-019.1 Hold Harmless Provision (Nov 30 2006), in PART V, CONTRACT TERMS AND CONDITIONS, controls the contract's indemnification provisions.	V.23 Contract - 019 Hold Harmless Provision (Nov 30 2006), in PART V, CONTRACT TERMS AND CONDITIONS and Section 10 of Appendix F Indemnification of SERS both pertain to the contract's indemnification provisions.
6	N/A	Appendix F	Regarding Section 5(a) of Appendix F, please clarify what in the nature of the duties to be performed by the actuary for SERS would make the actuary a fiduciary (as defined in ERISA) with respect to SERS and the Fund.	Section 5(a) of Appendix F provides that it is the actuary that is representing that it acknowledges it is a "fiduciary," as defined in ERISA, with respect to SERS and the State Employees' Retirement Fund.





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## I. Statement of the Problem

Hay Group is pleased to submit a proposal to provide actuarial and pension plan consulting services for the Pennsylvania State Employees' Retirement System (SERS, or the System) in response to the December 4, 2015 request for proposal (RFP) for actuarial services. Through this response, all consultants in Hay Group will be available to assist SERS. The need for the services is a direct result of the authority and responsibilities of the State Employees' Retirement System Board (the Board). The Board is an independent eleven-member Board of Trustees responsible for administration of the plan and investment of the retirement fund.

SERS is a defined benefit plan that is mandatory to all specified classes of employees. The system receives contributions from more than 104,000 active members with a payroll of about \$6.0 billion and pays benefits of over \$2.5 billion annually to more than 122,200 retired members and beneficiaries. As of December 31, 2014, the State Employees' Retirement fund (the Fund) had net assets available for benefits of approximately \$27 billion.

The State Employees' Retirement Code requires that SERS engage an actuary to perform an annual valuation of the retirement system and a five-year actuarial investigation and experience study of the Fund. Also, the actuary will be required to make an annual valuation of the SERS Benefits Completion Plan (BCP). Hay Group can assure SERS that we will complete and submit the results of our annual actuarial valuations for the Fund and for the BCP within five months of the end of the calendar year, consistent with SERS' desire to expedite the process. Note that throughout the contract, the actuary will often be called upon to provide analysis of benefits proposals and other potential changes to SERS using the valuation results and other actuarial and financial information. The actuary appears before the Board, and other interested parties, to explain the actuarial results.

The Hay Group overall team will continue to be led by the current Client Manager and Supervising Actuary, Brent Mowery, a highly qualified senior actuary, whose expertise and capabilities are well known to SERS. Under Brent's continued leadership, Hay Group will provide the full range of actuarial consulting services essential to successfully operate one of the most complex retirement systems in the United States. Our proposed team also includes eight other Hay Group actuaries, attorneys and consultants who have had successful past experiences on the SERS engagement.





Included in the actuarial consulting services listed in the RFP are pension plan and human resources consulting services in areas such as technical, legal, plan design, strategic planning, benefits communication, benefit program management and other human resources issues. Through the combined expertise of Hay Group's actuarial team, benefits attorneys and other human resources consultants, we propose to continue to assist the Board and SERS by providing the full range of services required.

SERS is among the nation's largest and most-respected public retirement systems. It is a very progressive and dynamic system, having received numerous awards. SERS' leadership not only adheres to best practices, they often lead the way to new, better ways to manage and administer a state-wide retirement system. Because they seek to be on the "cutting edge" of public pensions, SERS is constantly dealing with new considerations and facing new challenges. As actuary for such a system, Hay Group has also proven to be forward-thinking, flexible and readily available to assist with new developments. Some noteworthy examples of Hay Group consultants effectively collaborating with the Board and SERS during the current contract include:

- Conducted regular (at least annual) joint Board presentations with the R.V. Kuhns investment consultants to review the appropriateness of the expected long-term investment return assumption and the impact a change would have on employer costs and funding levels. (Included in the Appendix to this Technical Submittal is a copy of the Memorandum to the Board prepared by Hay Group for the March 2015 Board meeting.)
- Provided technical assistance and advice to the Board relating to the Act 120 Shared Risk Member Contribution.
- Assisted with implementation of new governmental accounting standards, including a willingness to take strong positions on issues that arose (sometimes challenging SERS' auditor's position) and to make judgment calls when there was uncertainty.
- Frequently undertook, as requested by SERS, analyses of proposed legislation under difficult circumstances, typically under tight time constraints. **Note:** Requests from the legislature for a fast-turnaround actuarial cost analysis/note have occurred frequently; Hay Group has shown outstanding flexibility and diligence through our efforts to meet the desired timeline. (Included in the Appendix to this Technical Submittal is a copy of a typical set of actuarial work products, this set developed in response to a December 2015 legislative request for a cost note relating to Senate Bill 1082, and several variations thereon.)



SERS is a mature retirement system with more beneficiaries receiving benefits than active members contributing to the system. Mature retirement systems present different challenges, with the need to liquidate assets to pay benefits, manage the longevity risk, as well as the increased volatility that emerges when more than half the liability is attributable to annuitants and beneficiaries.

**Our Strength is Our Experience, Responsiveness and Dedication to Excellence**

Hay Group has unparalleled knowledge of and experience with SERS, that makes us uniquely qualified to serve your needs now and in the future.

We have been SERS' partner in analyzing legislative proposals, and developing timely and responsive information both for SERS and the legislature. At the same time that the legislature was placing great demands upon Hay Group to review and analyze pension reform proposals, we have continued to work on our examination of SERS' most recent five years of actuarial experience (the "18<sup>th</sup> Actuarial Investigation of SERS") and will present our findings to the Board in late January. Were it not for Hay Group's extensive experience as SERS' actuaries and our team's dedication to excellence on SERS' behalf, the timely and accurate completion of these important actuarial work products would not have been possible.



## II. Management Summary

SERS needs actuarial, benefits and other human resources consultants who are readily available to address any of the needs identified in the RFP. Effective use of consultants on a specific project necessitates availability of well-designed complete human resources software and databases. For instance, the actuarial valuation requires application of a proven, accurate high-speed computer valuation program to analyze data on all SERS employees and retirees and project their retirement needs for most of the 21<sup>st</sup> century.

The products and services that will be provided by Hay Group in response to this RFP consist primarily of a wide range of pension actuarial consulting services. These actuarial consulting services include:

- Annual valuations of the Fund and the Benefits Completion Plan (BCP);
- The five-year actuarial experience study; and,
- Other general actuarial duties as requested by SERS.

In addition, other non-actuarial pension plan consulting and human resources advisory services will be readily available through Hay Group's benefits attorneys and consultants and will be provided to SERS as needed. These consultants will assist SERS in areas such as technical and legal interpretation and compliance, plan design, strategic planning, benefits communication, benefit program management and other human resource issues. Some of these services will require product deliverables to the Board and its staff for review.

This section first presents Hay Group and describes our resources that will be called upon to meet the needs of SERS. We then identify the key team members who will provide the services required by the RFP and summarize their capabilities to provide the required services. A complete description of the team is included behind Tab V of this submittal.

### *About Hay Group*

Hay Group is a global human resources management consulting firm that works with leaders to transform strategy into reality. We develop talent, organize people to be more effective and motivate them to perform at their best. Our focus is on making change happen and helping people and organizations realize their potential.



Effective December 1, 2015, Korn Ferry, the well-known executive search firm, acquired Hay Group. This transaction created a firm of over 7,000 employees, after combining Hay Group's 3,000 employees with Korn Ferry's 4,000 employees. Of the three distinct business lines that have been established post-combination, the largest is Hay Group, which now consists, essentially, of all the original 3,000 Hay Group employees plus 1,000 former Korn Ferry employees who specialized in Leadership and Talent consulting.

It is important to note the following regarding the impact of this combination on Hay Group's response to this RFP for actuarial and pension plan consulting services:

- We are confident that this business combination genuinely has no adverse impact on Hay Group's response.
- Korn Ferry, pre-combination, did not offer any employee benefits consulting services, had no such consultants and, certainly, employed no actuaries.
- The combination itself is not expected to result in any involuntary terminations of Hay Group actuaries or benefits consultants.
- For all Hay Group actuaries, attorneys and consultants who have been on our SERS team in the past and/or who have been designated to be on the team hereafter, there is no expectation that this combination will increase the likelihood of their deciding to voluntarily terminate their Hay Group employment.

As a result of the combination described above, an exciting and promising development for both companies, Hay Group (which has retained its name, but is now a Korn Ferry company) now has over 4,000 employees worldwide working in 88 offices in 47 countries. Our clients are from the private, public and not-for-profit sectors, across every major industry, and represent diverse business challenges. As has been true in the past, most of the consultants on Hay Group's proposed team for SERS are located in either our Metro Washington DC office, in Arlington, Virginia, or in our Philadelphia office. Both of these Hay Group locations afford easy access (1 to 2 hours of driving) to Harrisburg.

Huggins and Company, the predecessor to the current benefits consulting practice at Hay Group, was founded in 1911. Huggins was one of the first consulting organizations in the United States to provide independent actuarial and benefits consulting services. Hay Group and Huggins merged in the 1970s to form Hay/Huggins and Company. Currently, the actuaries



and benefits specialists are designated as the Benefits Division of Hay Group. These services are provided by expert consultants using proprietary databases and analytical models. We offer a team of our most qualified consultants to meet the critical needs of this RFP.

Hay Group has helped thousands of clients worldwide to achieve their goals and strategies by addressing critical people issues. We have worked with organizations ranging in size from less than 50 to more than 500,000 employees, and we consult with clients in both the private and public sectors, including major manufacturers, financial service companies, health care organizations, high technology corporations, not-for-profits, higher education institutions, and all levels of government. In addition to actuarial and benefits consulting, Hay Group offers services in reward/compensation consulting, human resources and leadership training, planning and development, work transformation, employee surveys and culture studies, business strategy and organizational effectiveness.

Hay Group pioneered the development of employee benefits measurement and comparison systems and continues to maintain an extensive database of employee benefits and personnel policies of U.S. employers.

Our consultants combine their expertise with Hay Group's proprietary database and information systems, enhancing our ability to deliver robust consulting services to our client. At Hay Group, the idea of partnering with clients to deliver tangible results is not a cliché, it is the only way we conduct business.

Hay Group takes pride in being able to say that we have developed:

- An exclusive relationship with Fortune magazine to benchmark best practices concerning the "World's Most Admired Companies."
- Numerous publications that have set the pace for large-scale employee behavior change.
- One of the only integrated Total Remuneration (compensation and benefits) databases in the world...and now available through the Internet (via Hay Group's proprietary PayNet™).
- Global, state-of-the-art databases in the following areas: employee research, best HR practices, work culture, individual and organizational competencies, performance requirements, compensation and benefits.
- Proprietary methodologies to turn the information from these databases into today's progressive solutions.
- Custom solutions, with processes to monitor their effectiveness.



As one of the leading consulting firms, Hay Group is committed to partnering with our clients to deliver high quality, innovative, value-added responses to our clients' needs. We support the achievement of our clients' strategic objectives.

### ***Proposed SERS Team***

The primary resource required for the contract is the actuarial and pension plan consulting services of Hay Group's top-notch professionals. "Tab V. Personnel" includes the resumes of the primary consultants who will be assigned to this engagement both on an ongoing basis and as needed for specific tasks. All of these consultants have the education, training and experience, as well as the appropriate professional credentials where applicable, to fully meet or exceed the requirements of the RFP.

Hay Group proposes to meet the requirements of the RFP, as it has in past years of serving SERS, through its proven method of assigning the most appropriate consultants to each task and making sure that the consultants have the systems, tools and data needed to perform the task.

We propose to continue with Brent Mowery serving as both our Client Manager and Supervising Actuary for the SERS engagement. Brent has performed as Supervising Actuary for SERS over the last sixteen years. He is a Senior Principal in the Arlington, Virginia office and is fully qualified as a Fellow of the Society of Actuaries and an Enrolled Actuary under ERISA. Mr. Mowery has more than 40 years of actuarial consulting experience and over his long career has served many other actuarial clients in both the public and private sector.

During 2012, Hay Group designated Jim McPhillips, one of our firm's senior pension actuaries who had not been involved with SERS prior to that time, to serve as Peer Review Actuary for our SERS team. In that capacity, Jim has performed an independent and comprehensive peer review of: (i) all of our key actuarial reports prepared for SERS before they were finalized and released, as well as, (ii) some of the more important actuarial opinions we have rendered over the past three years. We have found that, in connection with virtually all the reviews performed by Jim as our Peer Review Actuary, he has raised questions and/or made recommendations that have led to improvement in our work products, an excellent outcome for both Hay Group and SERS. Therefore, we enthusiastically propose the Jim continue as our Peer Review Actuary.





To fully meet the needs of SERS, including any unusual needs, as may exist in times when SERS must confront new, different benefits-related issues and/or when there is a high demand for our actuarial/benefits consulting expertise, we continue to designate for SERS a large complement of actuaries and consultants organized into six teams, as follows:

1. An Actuarial Team – led by Craig Graby,
2. An Administrative Team – also led by Craig,
3. A Strategic/Research Team – co-led by Jim McPhillips & Melissa Rasman,
4. A Supplemental Actuarial Team – led by Yuri Nisenzon,
5. A Supplemental Administrative Team – led by Saul Lazarus and
6. An HR Consulting Team.

For more details relating to our proposed team and each of the individual members (including our SERS Team Organizational Chart), see Section V – Personnel.

### **Actuarial Team**

This is the core team responsible for the annual valuation and ongoing actuarial cost estimates and projections. This team will continue to be led by Craig Graby, who will be supported by Erika Mitchell and Jared Grove. Craig has been the lead actuary on the valuation and all our related actuarial services for over 19 years. The team includes Erika Mitchell, who has also been part of the valuation team for over 16 years. Jared Grove has served on the SERS actuarial team for over 5 years, working primarily on the actuarial experience study and, to a limited extent, on the annual valuation.

### **Administrative Team**

This team will also continue to be led by Craig Graby, again, supported by Erika Mitchell and Jared Grove. The Administrative Team is responsible for assisting SERS in administering the System's more complex benefit provisions, especially relating to unusual benefit payment options, QDROs and reviewing and updating forms, factors and procedures, to ensure accurate and timely benefit calculations.

A vital part of our Administrative Team is Melissa Rasman's ongoing support and analysis of compliance issues. Over the past years Melissa has provided compliance advice on some of SERS' most thorny questions, many of which require a thorough knowledge of applicable law but also a full understanding of governing Pennsylvania statutes and SERS administration.



As needed, Rob Landau, another benefits attorney in our Research Group who has assisted SERS in the past, will support Melissa.

### **Strategic/Research Team**

Our strategic/research team for SERS will continue to be co-led by senior actuary Jim McPhillips and Melissa Rasman Esq. This team will be at the ready to assist SERS with emerging issues in the retirement world, state government retirement systems, and other issues currently on the horizon. Statewide pension reform, while it has diminished some over recent years (versus the level of activity in the 2-3 years following the 2008 economic downturn) continues to be of paramount interest to members of the Pennsylvania legislature. The strategic team, also including senior attorney Rob Landau and senior actuary Kurt Fichthorn, will bring their vast pension experience to bear, ready to assist SERS in response to developments in the public sector actuarial community and issues relevant to SERS.

This team was initially activated during 2010 and was called upon by SERS soon thereafter to address and assist with evaluation of at least two different insurance-related proposals that were presented to SERS. Since then the team has been relatively idle, although Melissa Rasman has been called upon regularly to perform legal research and reviews.

### **Supplemental Actuarial Team**

This is a team that we established during 2010 to provide additional depth to our primary actuarial team. The purpose of this supplemental team is to provide expanded delivery capability – in essence adding a parallel actuarial team that can work on actuarial analyses and projections and similar tasks while the primary actuarial team proceeds with other actuarial projects. Our supplemental team includes Yuri Nisenzon (Team Leader), Jason Fine and Sanjit Puri, all of whom are qualified actuaries who have assisted on special actuarial/consulting assignments for SERS in the past. The supplemental team will also be bolstered by Greg Schoener, a senior actuary who manages Hay Group's valuation software and can quickly implement new or novel benefit provisions.

### **Supplemental Administrative Team**

This is another team that we established during 2010 to provide additional depth to our primary administrative team. The purpose of this additional team is to provide expanded delivery capability at times when SERS has



unusual demands for Hay Group assistance on individual member benefit calculations. The supplemental team includes Saul Lazarus (Team Leader), a credentialed actuary with more than thirteen years of experience and extensive past involvement with certifying individual participant benefit determinations.

### **HR Consulting Team**

To provide expert advice in other areas of human resources management besides employee benefits consulting services, as we have in the past, Hay Group will continue to make available to SERS our full range of consulting expertise. In the past, this has included reward/compensation consulting, as provided by our experienced reward consultant, Myriam Michaels. Given the significant expansion (as a consequence of our combination with Korn Ferry) of our new firm's Leadership and Talent (L&T) consulting practice, we felt it appropriate to introduce, and add to the SERS team, our senior L&T consultant, Connie Schroyer PhD. Depending upon SERS' needs, Myriam and/or Connie will call upon other Hay Group consultants whose areas of expertise enable them to be responsive to SERS' particular needs.

We have reviewed the forward commitments of each of the identified consultants and can assure SERS that they will be available when needed to address both the ongoing work and special assignments as may occur in the future. As we have demonstrated consistently in the past, Hay Group has both the depth and breadth of consultant expertise to staff any required tasks simultaneously.



### III. Work Plan

The objective of SERS is to select a firm to serve as Actuary to SERS and the Board for a period of five years, from July 1, 2016 through June 30, 2020. This section of the Hay Group's Technical Submittal shows our work plan to perform the services described in the RFP. This section concludes with a description of the project management system that would apply to all of the services Hay provides. This section discusses each of the requested services:

- Actuarial consulting services other than the experience study and valuation services,
- Experience study services, and
- Valuation services.

#### *Actuarial Consulting Services*

Actuarial services that will be provided under the contract include actuarial consulting services on any technical, policy, legal, or administrative problems that might arise during the course of operations. The services related to the actuarial experience study and actuarial valuations are described later in this section.

Usually, consultations regarding actuarial issues can be handled by e-mail, telephone or written correspondence. Some requests for explanation of items in the actuarial reports can be handled during a phone call or by e-mail. Other requests require more research and analysis. Such requests usually arise from proposed legislation, litigation or changes in benefit computation procedures. In each case, the SERS Executive Director or designee will determine the need for actuarial assistance and contact the Hay Group Supervising Actuary or appropriate Team Leader with the request. As in past contracts, the Hay Group staff will be available to quickly, accurately and efficiently respond to these requests.

SERS will provide information on the statement of problem, such as draft legislation. After review of the request, Hay Group will query SERS for any additional data, such as distributions of retirees by characteristics defined in a legislative proposal. Hay Group will then work with SERS to obtain the information from existing databases or through interviews with appropriate Pennsylvania officials. Hay Group treats all client data as strictly confidential.

The actuarial services are included among the Actuarial Consulting Services listed in Section IV-2B of the RFP. These include services that are direct



products of performing the valuation and general consulting support to assist SERS in managing the program. Some of the specific services that will be provided under the contract are as follows:

- Provide actuarial consultation and advisory services on any technical, policy, legal or administrative issues arising during the course of operations.
- Make recommendations to SERS regarding possible changes or improvements in the financing structure of SERS and in response to new developments in the retirement industry.
- Provide recommendations to SERS on the reasonableness of economic assumptions such as inflation, investment return, and interest rates used to discount pension liabilities, including an annual meeting with the SERS Board (generally in March) to provide an update on this topic and to obtain Board approval of assumptions to be used for the upcoming actuarial valuation.
- Consult on policy and administrative issues related to any proposed changes to the SERS system including price analysis on proposed legislation.
- Assist in the preparation of proposed changes to the code and regulations.
- Develop and provide actuarial tables and factors needed to administer the SERS benefits including mortality tables, present value factors, option factors and survivor benefit factors.
- Assist in developing and implementing the strategic plan for SERS.
- Attend and participate in meetings, such as those held by the Public Employee Retirement Commission (PERC), to discuss actuarial standards and principles used in determining funding requirements and pricing proposed legislation.
- Attend and participate in (and support SERS in preparation for) public hearings conducted by legislative bodies, such as annual budget hearings.
- Assist SERS in establishing specifications for data files for the experience analysis and the valuations, as well as for other actuarial services. Hay Group would work with SERS staff to assure the accuracy and completeness of all data and revise specifications to conform to changes in actuarial and legislative requirements.
- Analyze proposed and enacted Federal retirement legislation that would have an effect on SERS, making reports to the Board. Advise SERS on developments in Federal legislation and regulations regarding financing, benefits, vesting, tax qualification and other issues of concern to SERS.
- Advise SERS on the pension accounting standards such as those of the Governmental Accounting Standards Board.



- Calculate reserve transfers for State Police and other special classes as needed.
- Certify optional benefit calculations as needed.
- Consult on the development of new or enhanced communications programs for SERS membership, including interactive and customized communications tailored to the SERS membership.
- Promote SERS participation, and collaborate/assist as appropriate, in activities intended specifically for large U.S. public sector retirement systems, for example a recent initiative by the Society of Actuaries to study U.S. public retirement system mortality experience.
- Assist SERS with any other support needed for its benefits programs.

Actuarial consulting services, other than the experience study and valuations, range from a quick response to a question for information to a request for extensive actuarial analysis of the cost and benefits of a legislative proposal. The findings of the more extensive studies are summarized in an Actuarial Cost Note. An Actuarial Cost Note must contain a complete explanation of the cost of the change to the system, whether it be a change in benefit provisions or a change due to mandated plan compliance, and the assumptions used in developing that cost. The Note must include enough information for the lay reader, as well as other actuaries, to have full information about the basis for the cost. Since the Cost Notes are often read by critical audiences, such as those whose benefits would be affected, the Note must convince the various audiences that the costs are accurate, complete and unbiased. The certifications on pricing, presentation of assumptions and other similar technical documentation will be approved and signed by the Client Manager or the Supervising Actuary.

Many of the Notes are reviewed by actuaries under contract to PERC who have consistently found that the Notes fully meet their requirements. We are available to explain any of the findings to the PERC actuaries or any other interested party.

The response time on special requests varies according to the complexity and requirements of the request. Requests that involve little research or calculation will be answered within a few hours or days. The formal schedule for delivery of a Cost Note is within two weeks of receipt of the request. This time will be extended when necessary for the aggregation of data or because of the complexity of the analysis that might be needed. Any such extension would be with the full knowledge and agreement of SERS. It may sometimes be necessary that an analysis be prepared in less than two weeks because of legislative or other deadlines. A project involving interaction of SERS and Hay Group staff, and requiring interim decisions by SERS, will require a more





fluid time frame that considers the need for the interaction. We believe that our response on past requirements has fully met the needs and expectations of SERS and we propose to continue to follow this approach to meeting those needs and expectations in the future.

Many of the actuarial consulting services involve close interaction among SERS and Hay Group staff. Some also involve interaction with staff of other contractors. Hay Group's team will assist SERS in coordinating the effort of all parties to achieve the stated goals on time and within budget. The Supervising Actuary and Actuarial Team Leader will continuously monitor the effort and report to SERS on any potential problems, including recommended corrective measures. Through this process, the tasks will be completed in a timely and efficient manner.

Each project will involve one or more reports summarizing the results and conclusions. The report will begin with a statement of the problem and continue with full documentation of the steps that were taken to address the problem. The report will present all findings or products of the project and include documentation of the basis for these findings and/or products. The report will include all descriptions and information necessary to convince the immediate and potential readers of the validity of the process and conclusions.

The Supervising Actuary or Actuarial Team Leader will present a proposed time frame for the response to each request. The time frame will include allowances for interaction with SERS staff, if any, before initiation of later phases of the project. For projects that extend over more than one month, the Supervising Actuary or Actuarial Team Leader will provide monthly reports comparing progress to expectations and stating the solution to any problems that might delay the project. Delays in product delivery would be solely to accommodate changing time frames for SERS staff.

Data needed for each task in this category will vary depending on the task. Data on the internal structure and requirements of SERS will be compiled by Hay requests to the appropriate SERS staff contact. As usual, all internal information from SERS or individual SERS member data will be held in strict confidence.

Many of the issues facing SERS, such as funding and accounting and actuarial cost calculation approaches, also face PSERS. SERS and PSERS have often asked their actuaries to work together on analysis of these issues. This approach has lowered the cost of having two actuarial firms perform the same calculations and has resulted in consistent format and presentations. We are



very comfortable working on these joint efforts when requested to do so by SERS.

### *Experience Study Services*

The next actuarial experience analysis will be for the period January 1, 2016 through December 31, 2020.

Charts 3A and 3B show the key steps in the work plan for the production of the experience study. Most of the work on the experience study will occur in 2020 and 2021. However, the preparation for the evaluation must begin in 2016. It has been our experience that waiting five years and then gathering and analyzing all of the data has two drawbacks. First, if there is a problem with the data in the early years, it might be impossible to correct if it is first noticed in 2020. Second, analysis of the data each year permits the actuary to identify evolving trends that should be brought to the attention of the Board. This process permits the Board to anticipate changes that might have impact on the employer cost.

As we did for the 2010 - 2015 experience study, we propose to review the data through annual requests for and analysis of data for the calendar year. By this method we can identify questionable data soon after the year from which it is drawn. This method is also advantageous in that the experience data is readily available if the results of the annual valuation are not what was expected.

The first steps in the process are the annual collection and analysis of data from the prior year. This is done in conjunction with the collection of the valuation data. The data are reviewed for possible errors and changes in trend. Any problems or changes are reported to SERS. This process is repeated for each of the four calendar years (2016-2019).

The experience study is based on tracking and analyzing the most recent five years of demographic and economic data. However, if the evaluation was not prepared until full experience in the calendar year 2020 was available, the results could not be considered for the December 31, 2020 valuation. Therefore, the data for the year 2020 will be cut off before the end of 2020 to permit analysis and presentation of draft study results at the January 2021 Board meeting. The final months of 2020 will be accounted for by using data from the end of 2015 to create 5 years of data.

After presentation at the January Board meeting, the actuary revises the results, as necessary, to address any questions or concerns raised by the Board. A final evaluation is presented at the March Board meeting for formal adoption of



assumptions by the Board. The assumptions can then be considered for the December 31, 2020 valuation.

As shown by the work plan, the Hay Group will not have a problem meeting the SERS time frame.

The Supervising Actuary and Actuarial Team Leader will be available for follow-up meetings with interested parties in the Commonwealth.

### *Description of the Report*

After approval by the Board, the final report of the experience analysis will be delivered to SERS by March 31, 2021. The report will describe the reasons for the changes in the contribution rates from year to year, based on a comparison of actual changes in liabilities with expected changes according to each of the various actuarial assumptions. Currently, these results are included in Schedule E of the annual valuation.

The annual valuation and cost estimates must be based on reasonable assumptions about the demographic experience and economic conditions that relate to the fund. The analysis of demographic experience assumptions will include, but not be limited to, rates of terminations by cause, service retirement rates, pay increase assumptions, mortality before and after retirement, disability, and termination from disability. Economic conditions include salary growth and investment return.

The report will discuss each of the actuarial assumptions and present a recommendation on the assumptions to be adopted for the succeeding five years. In many cases, a range of assumptions will be reasonable so Hay will present these and discuss the pros and cons of the variations within the range. The report will include a glossary of technical terms. The goal will be to provide a report that is sufficient for the Board to understand the basis for and range of choice and to make an informed decision on the set of assumptions to adopt.

The Appendix to this Technical Submittal contains a copy of our most recently published (in early 2011) actuarial experience study report (based upon plan experience over the period 2005 through 2010). The sections of the report include:

- An introduction explaining the reasons for and uses of the report.
- An executive summary summarizing the key findings.
- A section providing background on the experience study analysis.



- A statement presenting the analysis of the economic experience and recommendations on changes, if any, in economic assumptions.
- A statement presenting the analysis of the demographic experience and recommendations on changes, if any, in demographic assumptions a summary of the recommendations.
- A statement presenting the analysis of other experience.
- A conclusion summarizing the recommended changes.
- A statement on considerations for members entering under Act 120.
- An actuarial certification.
- A glossary of terms.
- An appendix that includes complete tables of recommended economic and demographic assumptions for consideration by the Board.

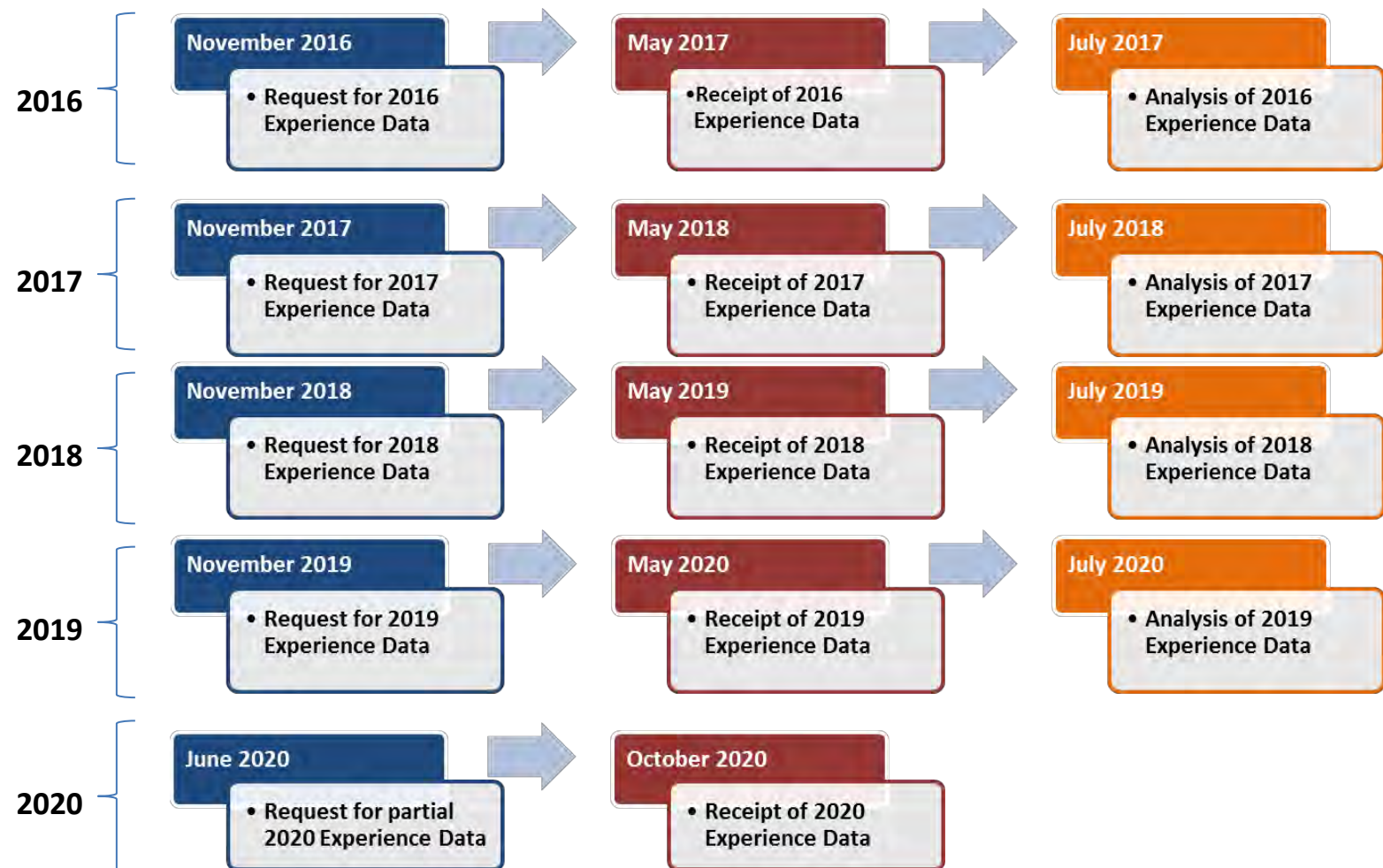
The selection of assumptions is a process that involves extensive discussions between the actuary and the SERS Board. The Board has a fiduciary responsibility to the members of SERS to make sure that adequate funds will be available to pay promised benefits. The actuary develops demographic and economic assumptions that are consistent with past Board actions as well as the experience of the system. These are then presented to the Board for consideration and action.

It is important to note that the assumptions are selected by the Board. The Board starts with the actuary's findings and recommendations, but then considers all aspects of the level and burden of financing on all parties before selecting a set of assumptions. The actuary signs an opinion as to the reasonableness of the assumptions. Our position is that there is a range of acceptable assumptions, and that the Board must consider a number of aspects of the financing of the system when selecting from that range. Changes in the initial actuarial recommendations that have been made by the Board in the past have been within the range of assumptions that the actuary considered to be reasonable. The primary goal of the actuary and the Board is to set assumptions and funding procedures that assure the financial soundness of the system.

Hay Group estimates that the entire experience study process takes about 200 hours to complete.

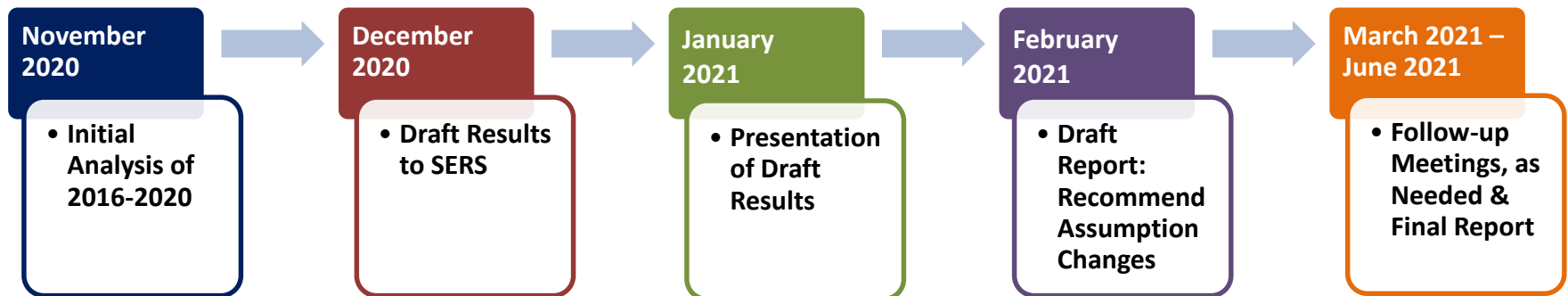


**Chart 3A**  
**Work Plan for SERS Five-Year Experience Study (2016-2020)**  
**Data Collection and Analysis**





**Chart 3B**  
**Work Plan for SERS Five-Year Experience Study (2020 – 2021)**  
**Full Five-Year Analyses and Report Preparation: Assumption Change Recommendations**







### *Valuation Services*

The actuarial valuation will be performed each year as of December 31. The first report produced under this contract will be as of December 31, 2016. Charts 4A and 4B illustrate the process for production of the December 31, 2020 valuation. We show the process for December 31, 2020, because that valuation will include the incorporation of the new assumptions and, therefore, be more complex than the other four valuations.

The SERS staff and the Hay Group team have carefully designed and updated this process over the years to ensure a timely and accurate report to the Board. At this time, we do not propose to change the overall process. However, we will continue to work closely with SERS to identify and incorporate changes that might be needed in response to changes in the SERS law and regulations.

The first step of the valuation process will be to request the data. There are usually few changes in requirements from year to year. However, it is necessary to review the request annually to make sure that changes in the system that may affect the data are incorporated and that any problems that may have been observed in the prior year's data have been corrected. In general, the request is provided by the end of November preceding the valuation to give enough time to the SERS staff to incorporate any changes. Hay Group treats all client data as confidential, and the request for data or other necessary reports are channeled through the Executive Director or a designee.

In January and February, while awaiting the receipt of data, plan and benefit changes that occurred in the prior year are carefully reviewed and modifications are made to the valuation programs where needed. This step includes discussions with SERS staff to make sure that all changes are considered.

Also in January and February, Hay Group is reviewing the assumptions used in the valuation. This is not a full experience study but rather a targeted review of certain assumptions. One such review is of the investment return and inflation assumptions. In light of the 2008 economic downturn, subsequent volatility in the markets and ongoing liquidity issues faced by SERS, Hay Group is regularly monitoring the expected investment return of the SERS fund. We gather information from SERS (including information from its investment consultant) to gauge whether the current assumption needs to be modified. Hay Group also monitors the negotiated changes in collective bargaining agreements to determine whether any short-term adjustments to the assumptions are warranted.



Upon review of any plan changes and any assumption changes, Hay Group updates and tests its valuation programs to make sure that these changes are properly reflected in the valuation liabilities.

The data are received in February in two files - active and inactive. We have established a secure web site for SERS to use to post the data. The files are immediately processed through the data edit system of Hay's Pension Valuation Language (PVL) to make sure the data are valid. Edit checks and control totals from PVL are compared to control totals provided by SERS. Any questions are raised immediately with the SERS staff.

It has been our experience that the validation process is the step that may cause significant delays in the valuation process. In the worst case situation the data file cannot be read or has too many errors so that a new file is needed. Our work plan allows sufficient time to recover from a problem of this type. If a revised data file is needed, the initial steps of the process will be set back; however, speeding up the intermediate steps will recover the lost time and keep the project on schedule.

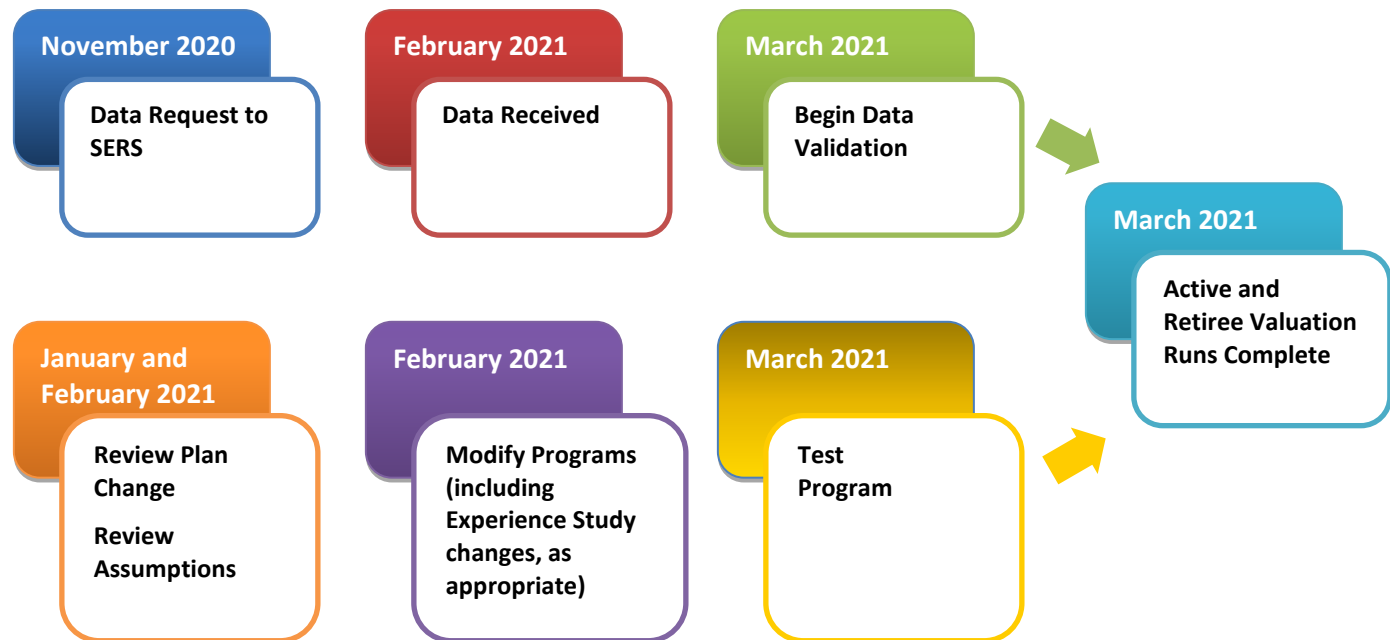
While the data are being validated, selected records are used to test the program and the data format. This step includes a complete processing through the valuation program for each of the records. Detailed PVL printouts permit comparison of total results with the prior year, as well as the detail needed to make sure that any changes have been incorporated.

The data validation and program testing are completed by the end of March. With the validity and accuracy assured through prior steps, the full valuation can be run in the first half of April. This results in production of the information needed to complete the valuation tables and report the initial findings to SERS. This early reporting permits SERS staff to review the findings and ask any questions well in advance of the public reporting at the Board meeting. This carefully structured process permits the Board to take final action well before the July 1 effective date for the new employer contribution based on the valuation.

The following charts show that the valuation results will be delivered to SERS no later than eight weeks after receiving the data. In 2021, after the Experience Analysis is performed, the results will be delivered no later than eight weeks after the Board has adopted the assumptions for the valuation, if that is later than the normal schedule. The valuation for that year will be performed, and results presented, using both the old assumptions and the new assumptions.

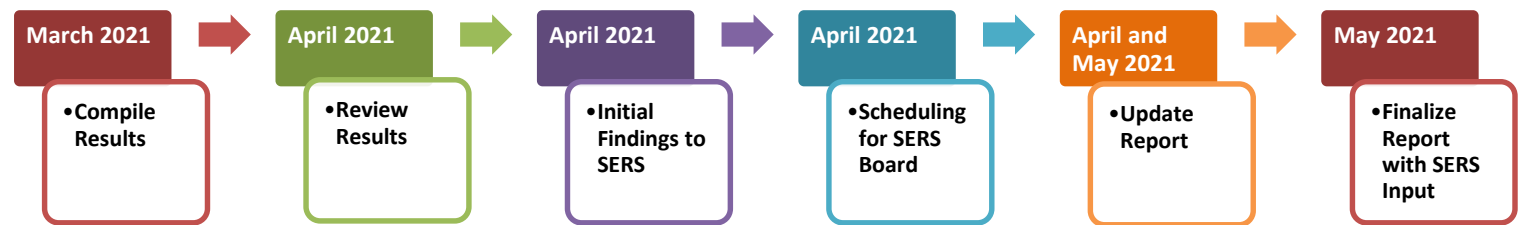


**Chart 4A**  
**Work Plan for December 31, 2020 Valuation**  
**Data and Valuation**





**Chart 4B**  
**Work Plan for December 31, 2020 Valuation**  
**Results and Report**





The timing of delivery of the initial valuation results varies depending on the date of the first Board meeting following completion of the valuation. Each year, this meeting is identified as the end point for delivery of the draft findings, and the work plan is modified as needed to deliver the results at that meeting. The Supervising Actuary and Actuarial Team Leader will appear at that meeting to present and discuss the results.

After the draft results are accepted by the Board, the final draft report is prepared and provided to SERS for review and comment within approximately four weeks. SERS' input at this stage is highly valued by our team and usually does result in important adjustments being incorporated into our final report. Our practice is to deliver, generally by the time of the June Board meeting, an initial set of copies of the final report for use by SERS and its Board and then to produce and deliver the remaining copies within the following two weeks.

Hay Group also performs a valuation of the Benefits Completion Plan (BCP). The data request and process are similar to the main plan valuation process. The data is received in February and the results are compiled and reviewed and included in the April package to the SERS Board. The final draft BCP report is prepared and delivered to SERS for review at the same time that we send the final draft of the main plan report. All copies of the final BCP report are sent with the initial set of main valuation plan report copies that are provided to SERS.

As shown by the work plan, the Hay Group will not have a problem meeting the SERS time frame.

Hay Group estimates that the entire valuation process takes about 300 hours to complete.

### ***Description of the Report***

The annual valuation must include the information needed to report on the actuarial status at the end of the prior calendar year and to establish the cost of SERS for the coming fiscal year. The report will be delivered in both hard copy and electronically. The main purposes for the report are to establish the basis for and amount of:

The employer contribution rate in aggregate and by employee category on a "going concern" basis. The going concern basis assumes that the system would continue with crediting of future service and acceptance of new members. This is the current reporting basis. Different categories are set for different classes or retirement conditions.



- The unfunded actuarial accrued liability and amortization amount on a going concern basis.
- The funds to be transferred among accounts.
- Information on the actuarial status of SERS at the end of the prior calendar year, including the information needed for accounting purposes. This would include calculations in compliance with Governmental Accounting Standards Board (GASB) Statement Number 25. The new GASB 67 and 68 accounting is handled through separate reporting.

The format of the actuarial valuation report for SERS is reviewed each year to ensure that it meets all current requirements. The review includes consideration of changes in the SERS legislation and procedures, changes in accounting rules and discussions with SERS staff. Since there are many different uses of the valuation, and actuarial calculations are complex, the final product could simply be an exhaustive presentation of a set of tables covering all aspects of the system. However, it is our practice to include as much information as is needed without overwhelming the audience with statistics. At the same time we include a concise and clear explanation of the reasons for the year-to-year changes in the plan liability and employer cost.

Hay Group has worked closely with SERS to ensure that the report contains all the information necessary for the Board and the administrative staff. The report contains explanatory text to permit reasonable understanding of the actuarial assumptions, cost methods and conclusions by recipients of the reports, i.e., Board members, legislators, government administrators and other interested parties.

The Appendix to this Technical Submittal contains a copy of our most recently published actuarial valuation report (covering our December 31, 2014 valuation). Our report on the annual valuation for SERS will continue to include the following sections:

- Valuation highlights and comments on schedules that show the key actuarial findings for the current and prior year and explain the level and trend of costs in each of the schedules in the report. We include a graph which shows a 30-year history of the employer contribution rates.
- Development of the aggregate employer contribution in Schedules A and B. These schedules show each of the components of the total and employer cost, such as the unfunded actuarial accrued liability.
- Schedule C shows the development of the contribution rate by group.
- Schedule D is a relatively new table (introduced after Act 2010-120) which shows our development of the shared risk member contributions.





- Schedule E shows the major reasons for the change in employer contribution and unfunded actuarial accrued liability.
- Schedule F shows that the current and projected assets and liabilities are in balance and Schedule G shows the transfers that are required to maintain the proper balance by account.
- Schedules H and I show the accounting information required under Governmental Accounting Standards Board (GASB) Statement 25 including the Annual Required Contribution and Solvency Test.
- Schedule J develops the actuarial value of assets that is used in the determination of the employer contribution.
- Schedule K shows the past history and an eleven-year projection of the annuitants and active employees, and the contributions to and benefit payments from the Fund.
- Schedule L shows a display of age groups and service matrices for active members and a display of retired lives by age group and types of benefits.
- Schedules M through O contain a description of the benefits, actuarial assumptions, methods and procedures.
- Schedule P is a glossary that includes definitions of technical terms.

### ***Enhanced Hay Group Annual Actuarial Report Will Continue***

In the interest of continuing to provide a more attractive, modern look to the six key actuarial reports that will be published over the coming five years, and to be responsive to the Commonwealth's desire to encourage utilization of minority- and woman-owned businesses within Pennsylvania, Hay Group will continue to use the revised approach to report production and printing that we initiated in 2012.

That is, effective in 2012, Hay Group began to engage a Harrisburg area firm, Triangle Press, Inc. (Triangle Press), an outstanding minority/woman-owned printing business which the Commonwealth has certified as a Small Diverse Business, to handle the production and printing of the major actuarial reports we publish for SERS. Because we have been very pleased with the results of our partnership with Triangle Press, we propose to continue to call upon them to help us print and produce all six major actuarial reports (5 for the annual valuations and the 6<sup>th</sup> for the experience study) that we will be preparing over coming years.

If one goes to Triangle Press' internet home ([www.trianglepress.net](http://www.trianglepress.net)), here are some of the key facts one learns about the company:

Triangle Press has been serving the greater Southcentral Pennsylvania area's printing needs since 1970. Long-time associates and co-owners, Eric Baum,



Adrienne Kihm, Tammy Shelley and Bo Vu, combined have over 100 years' experience in this industry and are considered experts in their respective roles with the company. Triangle Press is a full-service print and digital solutions provider.

Here is a partial client list (including some clients not served recently):

### **State and Federal Agencies**

Administrative Office of the Pennsylvania Courts  
 Commonwealth Court of Pennsylvania  
 Legislative Budget & Finance Committee  
 Legislative Publications Office, PA House of Representatives  
 Millersville University  
 Pennsylvania Bureau of Forestry  
 Pennsylvania Lawyers Fund for Client Security  
 Pennsylvania Liquor Control Board  
 Pennsylvania School Boards Association  
 Pennsylvania State Chapter FBLA  
 Pennsylvania State Education Association  
 Pennsylvania State System of Higher Education  
 Pennsylvania State University  
 Penn State Harrisburg Student Government Association – Capitol Campus  
 Slippery Rock University  
 Supreme Court of Pennsylvania  
 Temple University Harrisburg (2004)  
 U.S. Postal Service (Harrisburg & Scranton offices)  
 University of Pittsburgh - Greensburg Campus

### **Pennsylvania Municipalities**

Lower Paxton Township  
 Lower Swatara Township  
 Manheim Borough  
 Mount Joy Borough  
 South Hanover Township  
 Steelton Borough  
 Susquehanna Township  
 West Hanover Township

In SERS' best interest, prior to beginning to work with them in 2012, Hay Group performed the appropriate due diligence, by visiting Triangle Press' site, meeting with Eric Baum, their President, and Adrienne Kihm, their CEO, and reviewing samples of their work. We concluded then that it was



truly an impressive firm, with far-ranging talents. Annually since 2012, in our ongoing work with Triangle Press to produce the SERS reports, we have continued to be quite impressed and comfortable with their firm's leadership and reliability. In short, we are confident that they will continue to be an excellent partner for Hay Group and an outstanding, high quality service provider to SERS.

One closing comment regarding our annual actuarial valuation reports: Preparation and delivery of the valuation is only the first in a number of steps required to successfully meet the needs of SERS. The report must be presented and defended first before the Board and then before a number of organizations with oversight responsibility. The Supervising Actuary and Actuarial Team Leader will be available on an ongoing basis to provide additional support as needed. This would include at least one visit each year to SERS offices in Harrisburg, to present to the Board (typically at their April meeting) our annual actuarial valuation results, but in some years may also include an additional meeting to present our results to the Public Employee Retirement Commission.

### ***Project Management - All Services***

Project management for each service will be similar in general, but differ in specifics. The request for consulting services for a major effort would result in a proposed solution being developed by the Supervising Actuary and either the Actuarial Team Leader or the Administrative Team Leader to be assigned to that project. In some instances, such as multi-phased tasks, other team leaders would be designated for parts of the effort. The proposed solution would include the following:

- A statement of the problem.
- Data needed.
- Time frames with critical project dates and final completion.
- Projected hours of effort by consultant.
- Total budget showing expenditures for consultant services and other costs.

The Supervising Actuary and/or the applicable Team Leader would discuss any questions with SERS and modify the proposed solution, if needed, to reflect changes requested by SERS. The project would then be initiated. Actuarial projects would be assigned to a team lead by either the Supervising Actuary or the Actuarial Team Leader. Pension consulting projects would be handled by a team headed by an appropriate team leader, depending upon the nature of the assignment. The project team leader(s), working closely with the Supervising Actuary, would spearhead the project and deliver the results to SERS.



The Supervising Actuary and team leader would oversee all projects and assign the personnel to the task. The Supervising Actuary or team leader would discuss the findings of the task with the SERS designee and then deliver the final report. For the more complex reports, including the annual valuations and the experience analysis, the Supervising Actuary and team leader would deliver the report to SERS and discuss the results. For any report, the Supervising Actuary and team leader would be available for a full and complete discussion of the findings and recommendations.

The team leader would monitor the day-to-day operation of the team and report periodically to the Supervising Actuary. The Supervising Actuary and team leader would immediately inform SERS of any potential problems with performing the task and the corrective measures that were being taken to address the problem.

The RFP requires that the Supervising Actuary be available within one working day for telephone requests and five working days for meetings in Harrisburg. We will guarantee that we will respond well within these limits. As SERS has found our goal is to respond even more quickly. If the Supervising Actuary is not immediately available, he usually responds to voice mail requests within a few hours. In the rare cases when the Supervising Actuary is not available for more than a day, he will advise the SERS contact as to which of the team leaders will be available for immediate assistance.

The Supervising Actuary will review the performance of all tasks at the time of completion of the task. If there were any significant problems that affected the performance, the cause would be identified and corrected so that the problem would not recur on future assignments. The Supervising Actuary would also periodically review the performance of all consultants on the engagement to ensure that the contribution of these consultants was the best possible. In the event of poor performance by a consultant that could not be corrected, that consultant would not be assigned to any future SERS task.

During 2012, Hay Group designated one of our firm's senior actuaries to serve as Peer Review Actuary for our SERS team. In that capacity, this individual has performed an independent and comprehensive peer review of (i) all of our key actuarial reports prepared for SERS before they were finalized and released, and as well, (ii) some of the more important actuarial opinions we have rendered. We have found that, in connection with virtually all the reviews that have been subsequently performed by our Peer Review Actuary, there have been questions raised and/or recommendations made that have led to improvement in our work products. This peer review process will continue.



#### IV. Prior Experience

Hay Group has provided more than eighty years of benefits consulting service and continues to provide services to thousands of organizations in both the public and private sectors. These engagements solidify Hay Group as a leader in all aspects of actuarial and pension plan consulting services in both government and corporate settings.

Major Hay Group public sector clients include states (including SERS and other state-wide public employee retirement systems), the Federal government and many local counties and municipalities. Full descriptions of relevant projects Hay Group has performed for a sample of these clients, including SERS, are included in the Project Reference forms on the following pages of this section. All of the client references included involve work by our proposed SERS team members. Contacts are noted in each of the references and SERS is welcome to discuss our work with any of these contacts.

##### *Our SERS Experience*

Hay Group is especially proud to have a long and successful history as the actuary for SERS. Hay Group has valued SERS as one of our most important clients since the 1920s. We believe that this relationship brings very important advantages to SERS. First, we have a continuous history of knowledge of the system. We will not have to expend any effort setting up and installing the sophisticated actuarial valuation system needed for a retirement system of this size and complexity. Also, when old issues arise, as they often do, we have the important in-depth, historical knowledge of the system that cannot be achieved even with extensive reading of past background or interviews with plan personnel.

An example of a recurring situation where Hay Group's longstanding familiarity with SERS pays dividends is in connection with SERS' annual preparation for Budget Hearings (which typically occur in March of each year). Hay Group is always in a good position to provide SERS with prompt and efficient responses, thereby providing meaningful support and helping SERS leadership to be effective and responsive in dealing with the issues that arise.

As an example of our past work for SERS, copies of our latest annual actuarial valuation reports and five-year actuarial investigation (experience study) may be found in the Appendix to this Technical Submittal.



### *Other Relevant Client Experience*

While SERS is a very important client, and our experience with providing service to SERS is the best evidence of our ability to provide such service in the future, our work with other large public retirement systems and other similar systems confirms our ability to provide the full range of required services to SERS. These include our work for the State of Maryland, New York State, the Federal government, other governmental authorities and local governments.

### *Client Experience – States*

The Project Reference forms that follow provide detailed information regarding Hay Group actuarial and benefits consulting services performed for:

- SERS,
- State of Maryland and
- State of New York





	Pennsylvania State Employees' Retirement System – Actuarial Valuation, Governmental Accounting, Experience Study, and Special Analyses	
<b>Contract Value</b>	Approximately \$2,000,000	
<b>Nature and Scope of Project:</b>	<p>SERS has many years of experience relying upon Hay Group to handle a variety of ongoing pension actuarial services, including:</p> <ul style="list-style-type: none"> <li>▪ Annual valuations of the liabilities and recommended contributions</li> <li>▪ Periodic analysis of experience for use in revising valuation assumptions</li> <li>▪ Annual benefit cash flow projections</li> <li>▪ Assistance with the calculation of the more complex optional benefit settlements, including most of those involving special considerations such as Domestic Relations Orders</li> <li>▪ Advice and analysis relating to proposed legislation, including preparation of actuarial cost notes to document cost analysis results, policy and administrative considerations and other findings. Hay typically provides 35-year projections of plan costs based on proposed plan changes so SERS can gauge the short and long-term impact of the proposal.</li> <li>▪ Ongoing advice on developments in federal legislation, accounting or other relevant regulatory bodies that could impact system financing, benefits, disclosure or other areas of concern to SERS. Especially important over the past two years, this has included advice and support relating to SERS' compliance with new pension accounting rules (Statements 67 and 68) established by the Governmental Accounting Standards Board (GASB).</li> <li>▪ Consultation on any technical, policy, legal, or administrative problems that might arise during the course of operations</li> </ul> <p>This work is exactly the same size and complexity as the proposed work.</p>	
<b>Project Duration:</b>	<b>Start Date Year:</b> Current contract = 2011	<b>End Date Year:</b> Ongoing
<b>Nature of the Client:</b>	The work is performed for the SERS Board, the Executive Director, and the Office of Member Services.	
<b>Nature of Client Audience:</b>	The services under the contract are used by the SERS Board, the Executive Director, Member Service, finance and audit staff, audit contractors, and a variety of other users, including members of the retirement system.	
<b>Number of Users:</b>	There are currently over 233,000 active and inactive members of the retirement plan.	
<b># &amp; Composition of Vendor Employees &amp;</b>	Vendor Project Manager/Key Consultant on Project Team: The SERS project is managed by Brent Mowery and Craig Graby. The remaining team on the project consists of Jim McPhillips,	



<p><b>Consultants Assigned:</b></p>	<p>Melissa Rasman Esq, Erika Mitchell, Jared Grove, Robert Landau, Kurt Fichthorn and a variety of others.</p>
<p><b>Client Contact Information:</b></p>	<p><b>Reference Contacts:</b>                  Mr. David E. Durbin                  Executive Director                  30 North Third Street, Suite 150                  Harrisburg, PA 17101-1716                   Telephone: (717) 237-0210      E-mail: <a href="mailto:ddurbin@pa.gov">ddurbin@pa.gov</a>                  Relation/Role to Project: Executive Director                   Mr. Joseph A. Torta                  Director, Office of Member Services                  30 North Third Street, Suite 150                  Harrisburg, PA 17101-1716                   Telephone: (717) 237-0277      E-mail: <a href="mailto:jtorta@pa.gov">jtorta@pa.gov</a>                  Relation/Role to Project: Director</p>



<b>Name of Client &amp; Project Title</b>	Maryland State Retirement and Pension System – Office of the Attorney General & Quality Review of Past Actuarial Work, Actuarial Expert Reports/Testimony	
<b>Contract Value</b>	\$250,000	
<b>Nature and Scope of Project:</b>	<p>The nature and scope of the work evolved over time, as follows:</p> <ul style="list-style-type: none"> <li>• Began May 2005 - Hay Group engaged to investigate adjustments made by Maryland actuary to their own prior valuation results</li> <li>• During 2005/2006: Review of results revealed likelihood of past actuarial errors; Hay Group traced error back to 1982 and determined cumulative funding shortfall that resulted; Hay Group issued report of findings and presented them to Board of Trustees</li> <li>• During 2007/2008: Retirement System, with Hay Group support &amp; assistance, formally charged actuarial firm with sub-standard services, seeking compensation for damages to affected systems</li> <li>• 2008/2009: After initial ruling in System’s favor, actuarial firm appealed decision. Retirement System engaged Hay Group, with Brent Mowery as lead expert, to prepare actuarial expert reports (1<sup>st</sup> issued August 2008, supplement issued March 2009). Brent Mowery provided expert testimony in 2008 and again on appeal in 2009</li> <li>• After another favorable ruling for the System in 2010, the actuarial firm unsuccessfully appealed the case to the highest appeals court in Maryland.</li> </ul>	
<b>Project Duration:</b>	<b>Start Date Year:</b> 2005	<b>End Date Year:</b> 2010
<b>Nature of the Client and Client Audience:</b>	The Office of the Attorney General includes benefits attorneys who serve as legal counsel for the Maryland State Retirement System. Acting on behalf of the Retirement System (and with the approval of the Board of Trustees), the Attorney General’s office engaged Hay Group, seeking actuaries with proven experience with state-wide systems and prior experience with expert testimony to provide independent quality review services.	
<b>Number of Users:</b>	The Maryland State Retirement and Pension System comprises more than 300,000 total members in seven different systems. The actuarial issues identified by Hay Group affected three of the smaller systems.	



<p><b># &amp; Composition of Vendor Employees &amp; Consultants Assigned:</b></p>	<p>Vendor Project Manager &amp; Lead Actuarial Expert – Brent Mowery                  Key Consultant on Project Team: Craig Graby</p>
<p><b>Client Contact Information:</b></p>	<p><b>Reference Contact:</b>                  Name: Rachel S. Cohen                  Title: Deputy Counsel- Office of the Attorney General                  Department: Maryland State Retirement and Pension System                  Full Address: 120 East Baltimore Street, Baltimore, MD 21202-6700                  Telephone: (410) 625-5684                  E-mail: rcohen@sra.state.md.us                  Relation/Role to Project: Project Manager</p>



<b>Name of Client &amp; Project Title</b>	<b>New York State Teachers Retirement System</b>	
<b>Contract Value</b>	<b>\$750,000 to date</b>	
<b>Nature and Scope of Project:</b>	Hay Group's proprietary actuarial valuation system, Pension Valuation Language (PVL), is installed for internal use by the office of the actuary to perform annual funding valuations, gain and loss analysis, and cost studies for the retirement system. PVL is used by Hay Group actuaries in support of the Commonwealth retirement system.	
<b>Project Duration:</b>	<b>Start Date Year: 1991</b>	<b>End Date Year: on-going</b>
<b>Nature of the Client:</b>	Office of the Actuary	
<b>Nature of Client Audience:</b>	The Chief Actuary and staff use PVL.	
<b>Number of Users:</b>	<b>4</b>	
<b># &amp; Composition of Vendor Employees &amp; Consultants Assigned:</b>	<b>Vendor Project Manager/Key Consultant on Project Team:</b> On-going system support and maintenance is handled by Kurt Fichthorn and Greg Schoener.	
<b>Client Contact Information:</b>	<p><b>Reference Contacts:</b>  Name: Richard Young                      Title: Chief Actuary  Department: Office of the Actuary  Full Address: 10 Corporate Woods, Albany, NY 12211  Telephone: (518) 447-2692  E-mail: RYOUNG@nystrs.state.ny.us  Relation/Role to Project: Primary contact</p> <p>Name: Kati Buccinna                      Title: Actuary  Department: Office of the Actuary  Full Address: 10 Corporate Woods, Albany, NY 12211  Telephone: (518) 447-2693  E-mail: kbuccinn@nystrs.state.ny.us  Relation/Role to Project: Primary user</p>	



### *Client Experience – Federal*

The members of our proposed team for SERS have performed extensive actuarial and retirement benefit consulting services, including numerous actuarial valuations and experience studies, for many Federal retirement systems. Most of the teams handling these projects have been led by our current and proposed SERS Supervising Actuary, Brent Mowery, and Actuarial & Administrative Team Leader Craig Graby. Major Federal government clients include the United States Postal Service (USPS), the US Department of State, the Department of Defense, the National Oceanographic and Atmospheric Administration, and the Public Health Service Commissioned Corps.

Members of the SERS team completed a replication valuation and audit of the Civil Service Retirement System (CSRS) and the Federal Employees' Retirement System (FERS) valuations performed by the United States Office of Personnel Management. These two retirement systems are the largest systems in the United States. FERS and CSRS cover 2,700,000 active employees and 2,600,000 retirees and other annuitants. The audit of FERS and CSRS included validation of the plan liabilities by decrement and multi-year projections.

In 2009 and 2010, members of the SERS team (specifically Mowery and Graby) also conducted desk reviews and audit support of the reviews conducted on the Department of Defense (DoD) Military Retirement System actuarial valuations for the Department of Defense Office of Inspector General. Subsequently, Kearney & Company, the CPA firm engaged by the DoD to perform audits of their Military Retirement Fund annual financial statements, having become familiar with Hay Group's actuaries during the 2009-10 reviews and needing actuarial audit expertise on their team, invited Hay Group to join forces with them. As a result, Hay Group, since 2013, has been acting in the capacity of subcontractor to Kearney, providing annual actuarial audits of the DoD Office of the Actuary valuation results, which, based upon covered lives of more than 4 million current and former U.S. military members, include actuarial accrued liabilities well over \$1 trillion.

Hay Group has performed actuarial services for the United States Postal Service (USPS) since the 1990's, including extensive work since 2003 on actuarial valuations and analyses of two employee benefit programs which cover USPS retirees, namely the pension plan generally applicable to pre-1984 hires (specifically, CSRS) and the post-retirement medical plan.





In 2010 and again in 2014, Hay Group performed an experience study of the demographic experience for Postal Service employees participating in FERS. The experience study was prepared in support of an appeal to the Office of Personnel Management on the normal cost rate applied to the USPS. The experience study showed that the demographic experience of Postal employees differed from federal employees and that their benefits could be funded appropriately with a lower normal cost rate.

Other Federal clients that are served by the Arlington office include the two retirement systems covering (i) Foreign Service officers employed by the U.S. Department of State and (ii) officers of the U.S. Public Health Service. For these clients, we perform annual valuations to determine the level of liability and contribution (or federal appropriation) needed for sound actuarial funding. As well, we perform periodic actuarial experience studies for the purpose of setting the most reasonable assumptions to project future economic and demographic events.

Project Reference forms follow for:

- United States Postal Service,
- United States Public Health Service and
- United States Department of State (relating to the Foreign Service Retirement and Disability Fund).



<b>Name of Client &amp; Project Title</b>	United States Postal Service – Actuarial and Consulting Services	
<b>Contract Value</b>	Contract modifications are made annually based on expected level of effort and USPS needs. Annual value varies from \$100,000 to \$250,000.	
<b>Nature and Scope of Project:</b>	Hay Group provides actuarial valuation and consulting services.	
<b>Project Duration:</b>	<b>Start Date Year:</b> 1990	<b>End Date Year:</b> Ongoing
<b>Nature of the Client:</b>	United States Postal Service. The major departments that use our services are: Human Resources, Finance, and Government Relations.	
<b>Nature of Client Audience:</b>	<p>As noted, we have multiple client audiences within the USPS. We provide support during labor negotiations to the human resources department. We provide financial analyses on the projected costs and financial position of the USPS pension plans and retiree medical plan. We also provide support for USPS government relations department on proposed legislation and the impact of that legislation on USPS costs, workforce size and composition, and pension and retiree health liabilities.</p> <p>In 2014, we conducted an experience study for USPS employees who participate in the Civil Service Retirement System to support of an appeal of USPS contribution to the Federal Employees' Retirement System.</p>	
<b>Number of Users:</b>	USPS employs over 450,000 employees. The retirement plans provide benefits to over 650,000 retirees.	
<b># &amp; Composition of Vendor Employees &amp; Consultants Assigned:</b>	Vendor Project Manager: Sanjit Puri Key Consultants on Project Team: Jared Grove, Craig Graby, Erika Mitchell.	
<b>Client Contact Information:</b>	<b>Reference Contacts:</b> Name: Vinay Gupta Title: Director Compensation & Benefits Department: Human Resources Full Address: 475 L'Enfant Plaza SW Washington DC 20260-5130 Telephone: (202) 268-5113 E-mail: vinay.gupta@USPS.gov Relation/Role to Project: Project manager	



<b>Name of Client &amp; Project Title</b>	Public Health Service – Actuarial Valuation, Federal Accounting Compliance, Experience Study, Periodic Cost Projections, and Annual Benefit Cash Flow Projections	
<b>Contract Value</b>	Approximately \$275,000	
<b>Nature and Scope of Project:</b>	<p>The Public Health Service Program Support Center has many years of experience relying upon Hay Group to handle a variety of ongoing pension actuarial services, including:</p> <ul style="list-style-type: none"> <li>▪ Annual valuations of the liabilities and recommended contributions plus mid-year estimates</li> <li>▪ Periodic analysis of experience for use in revising valuation assumptions</li> <li>▪ Assistance with accounting disclosure requirements</li> <li>▪ Periodic cost projections</li> <li>▪ Annual benefit cash flow projections</li> </ul> <p>PHS is smaller than SERS in size, but the PHS pension plan has a very complex set of assumptions. The PHS plan mimics the Military Retirement System.</p>	
<b>Project Duration:</b>	<b>Start Date Year:</b> Current contract = 2007	<b>End Date Year:</b> Ongoing
<b>Nature of the Client:</b>	The PHS work is performed for the Division of Financial Operations.	
<b>Nature of Client Audience:</b>	The PHS valuation results are used for financial reporting requirements by finance and audit staff and contractors.	
<b>Number of Users:</b>	There are currently over 13,000 active and inactive members of the retirement plan.	
<b># &amp; Composition of Vendor Employees &amp; Consultants Assigned:</b>	Vendor Project Manager/Key Consultant on Project Team: The PHS project is managed by Brent Mowery. The remaining team on the project consists of Jared Grove, Sanjit Puri, Craig Graby, and Erika Mitchell.	
<b>Client Contact Information:</b>	<p>Reference Contacts:</p> <p>Ms. Angela Walter            Division of Financial Reporting, FMS            Program Support Center—Parklawn Building            5600 Fishers Lane            Rockville, Maryland 20857-0001            Telephone: (301) 492-4945            E-mail: Angela.Walter@psc.hhs.gov            Relation/Role to Project: Financial Manager</p>	



<b>Name of Client &amp; Project Title</b>	Department of State Foreign Service Retirement Systems – Actuarial Valuation, Federal Accounting Compliance, and Experience Study	
<b>Contract Value</b>	Approximately \$300,000	
<b>Nature and Scope of Project:</b>	<p>The United States Department of State has many years of experience relying upon Hay Group to handle a variety of ongoing pension actuarial services, including:</p> <ul style="list-style-type: none"> <li>▪ Annual valuations of the liabilities and recommended contributions</li> <li>▪ Periodic analysis of experience for use in revising valuation assumptions</li> <li>▪ Assistance with accounting disclosure requirements</li> <li>▪ Annual appropriations projections</li> <li>▪ Annual benefit cash flow projections</li> </ul> <p>The Department of State – Foreign Service plans are smaller than SERS in size but similar in complexity. The plans are similar to the Federal retirement systems but have the opportunity for enhanced benefits if certain conditions are met.</p>	
<b>Project Duration:</b>	<b>Start Date Year:</b> Current contract = 2007	<b>End Date Year:</b> Ongoing
<b>Nature of the Client:</b>	The State Department work is performed for the Deputy Chief Financial Officer.	
<b>Nature of Client Audience:</b>	The State Department valuation results are used for financial reporting requirements by finance and audit staff and contractors.	
<b>Number of Users:</b>	There are currently over 33,000 active and inactive members of the retirement plans.	
<b># &amp; Composition of Vendor Employees &amp; Consultants Assigned:</b>	Vendor Project Manager/Key Consultant on Project Team: The State Department project is managed by Brent Mowery. The remaining team on the project consists of Craig Graby and Erika Mitchell.	
<b>Client Contact Information:</b>	<p><b>Reference Contacts:</b>            Mr. Christopher H. Flaggs            Deputy Chief Financial Officer            U.S. Department of State            2401 E St., NW, Room 1500            Washington, DC 20037</p> <p>Telephone: (202) 261-8620            E-mail: FlaggsCH@state.gov            Relation/Role to Project: Senior Manager</p>	



Mr. Robert Timothy Macdonald  
Managing Director - Financial Reporting, Policy and Analysis  
U.S. Department of State  
2401 E Street, NW  
RM/DCFO/FRPA - SA1 - H1500  
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Telephone: (202) 663-1447  
E-mail: [MacdonaldRT@state.gov](mailto:MacdonaldRT@state.gov)  
Relation/Role to Project: Project Coordinator



### *Client Experience – Governmental Authorities*

An example of the wide range of services Hay Group provides to many of our government clients is the work that Hay Group has performed for the Metropolitan Washington Airports Authority (MWAA). Since 1989 Hay Group has provided annual actuarial valuations, periodic experience studies and general consulting services in connection with the MWAA's two defined benefit pension plans. In particular, we have worked closely with MWAA executives to transition to GASB 67 and 68 accounting standards. Other services to MWAA over the years have included:

- A completely new and updated pension calculator and recordkeeping system,
- A needs assessment for an integrated human resources information system,
- Revisions and production of the Plan Documents and Summary Plan Descriptions for the retirement plans,  
and
- Preparation of system administration manuals.

Working collaboratively with MWAA senior management we developed a funding policy for the pension plans that takes account of the funded status of the plan.

The Port Authority of New York and New Jersey is another governmental authority client for whom the Hay Group has provided extensive pension and post-retirement benefit consulting services. Hay Group has served as the actuary for the PATH pension plan for many years, including regular valuations, special studies, and assistance with union negotiations.

Hay Group was also retained to be the Port Authority to evaluate post-retirement medical liabilities after the changes in plan design. Port Authority's post-retirement medical and life insurance program covers several thousand employees, generating substantial liabilities. We provided reports in compliance with GASB Statements 43 and 45. We helped the Port Authority become one of the first Part D sponsors, and we have helped the Port Authority save millions of dollars with innovative benefit strategies, lower their Annual Required Contribution by over ten million dollars, while preserving the benefit coverages and enhancing the benefits for low-income retirees.

We currently provide complete outsourcing of the plan administration and compliance work as related to Port Authority's Non-Exempt Employees Supplemental Pension Plan and serve as Health & Welfare benefit consultant





for Port Authority medical benefit program covering active and former employees.

Project Reference Forms follow for these two Hay Group governmental authority clients:

- MWAA and
- Port Authority of New York and New Jersey



<b>Name of Client &amp; Project Title</b>	Metropolitan Washington Airports Authority (MWAA) – Benefits Consulting	
<b>Contract Value</b>	\$600,000	
<b>Nature and Scope of Project:</b>	<p>Hay Group provides annual actuarial valuations for MWAA’s two pension plans and two post-retirement OPEB programs. Every three-to-five years we conduct an experience study, by which we recommend changes, where applicable, to the plans’ actuarial assumptions. In addition, we provide ongoing benefits consulting services, including, but not limited to: advice on pension and OPEB plan changes, cost analysis of proposed changes, compliance advice, assistance with drafting plan amendments and retirement board presentations.</p> <p>As with SERS, MWAA has been a long-standing client of our benefits practice. We provide many of the same services for both MWAA and SERS, such as providing actuarial analysis, cost analyses, compliance advice, strategic advice on benefits changes. While the number of plan participants is substantially smaller, the nature of the work for both governmental plans in many respects is quite similar.</p> <p>Hay Group also consults on MWAA executive benefits, and we have helped design MWAA’s executive retirement benefit program.</p>	
<b>Project Duration:</b>	<b>Start Date Year:</b> 2005 (consultants since 1989)	<b>End Date Year:</b> Ongoing contract
<b>Nature of the Client:</b>	The MWAA owns and operates the two metropolitan Washington, D.C. airports, and the Dulles Airport toll way and manages the construction of the extension of the train to Dulles Airport. Hay Group provides services under the immediate direction of the MWAA Benefits Manager, but we routinely interface with the CEO, CFO, COO, and VP of HR.	
<b>Nature of Client Audience:</b>	Most of Hay Group’s interactions are with the MWAA Benefits Manager and his staff, with frequent contact with the COO, who is the chairperson of the Retirement Committee and VP-HR.	
<b>Number of Users:</b>	The two pension plans have a total of approximately 1800 participants, the two OPEB programs have approximately 2000 participants.	
<b># &amp; Composition of Vendor Employees &amp; Consultants Assigned:</b>	<p>The client relationship manager is Robert Landau. The lead actuarial consultants are Brent Mowery and Sanjit Puri. Craig Graby serves as principal actuary, with support from Jared Grove, and others.</p> <p>As a long-standing client, most of our work is done during the December – March timeframe, during which time we prepare the four actuarial valuations and provide consulting around those issues.</p>	



**Client  
Contact  
Information:**

**Reference Contacts:**

Name: Anthony Vegliante  
Title: VP - HR  
Department: Human Resources  
Full Address: 1 Aviation Circle  
Telephone: (703) 417-8353  
E-mail: Anthony.Vegliante@mwa.com  
Relation/Role to Project: Project executive for MWAA

Name: Warren Reisig  
Title: Benefits Manager  
Department: Human Resources  
Full Address: 1 Aviation Circle  
Telephone: (703) 417-8658  
E-mail: Warren.Reisig@mwa.com  
Relation/Role to Project: manager



<b>Name of Client &amp; Project Title</b>	Port Authority of New York and New Jersey	
<b>Contract Value</b>	\$90,000 per year	
<b>Nature and Scope of Project:</b>	<p>The scope of the work covers three broad areas:</p> <ul style="list-style-type: none"> <li>• Pension plan administration, benefit calculation and compliance</li> <li>• Health &amp; welfare benefit consulting services</li> </ul>	
<b>Project Duration:</b>	<b>Start Date Year:</b> 2014	<b>End Date Year:</b> Ongoing
<b>Nature of the Client:</b>	<p>The Port Authority and PATH provide group health care, prescription, dental, vision and term life insurance benefits for active and retired employees, as well as for eligible dependents and survivors. Benefits are provided through insurance companies whose premiums are based on the benefits paid during the year, or through plans under which benefits are paid by service providers on behalf of the Port Authority or PATH. The Port Authority provides medical, prescription drug, life insurance and other benefits for its current and former employees in efficient and fiscally responsible manner. The Port Authority needs to comply with a number of the regulatory provisions and new compliance requirements brought by evolving healthcare reform.</p> <p>Perform budget analysis, claims projections and development of active and retiree funding rates each year, taking into account the City's goals for sharing the costs between employees and the City.</p> <p>For PATH employees who are not covered by collective bargaining agreements, the Port Authority provides supplemental post-employment payments resulting in amounts comparable to benefits available to similarly situated Port Authority employees. In January 2011, the Port Authority requested a determination letter from the Internal Revenue Service to recognize an amended and restated PATH Exempt Employees Supplemental Pension Plan as a qualified plan under the Internal Revenue Code. Right now the plan is a qualified governmental plan that requires annual compliance work, benefit statements, and customer service support.</p>	
<b>Nature of Client Audience:</b>	<p>Hay Group has served as the actuary for the PATH Exempt Employees Supplemental Retirement Plan since 1989. Duties include regular valuations, special studies, and assistance with union negotiations. In addition we were awarded a contract to administer all benefit calculations and plan communications. Currently, Hay Group provides complete outsourcing of benefit calculation, certification, compliance and customer service work.</p> <p>Since 2014 Hay Group was also retained as an actuary and health and welfare benefit consultant to advise Port Authority on cost analysis, plan design changes, compliance, budgetary projections and all other aspects of health &amp; welfare consulting service.</p>	



<p><b>Number of Users:</b></p>	<p>Over 7,000 Port Authority and PATH retirees and about 7,500 of active employees are covered by medical, prescription drugs, dental and vision plans.</p> <p>About 120 active and terminated PATH employees are entitled to benefits under PATH Exempt Employees Supplemental Retirement Plan, and just under 100 retirees collect payments under the same plan.</p>
<p><b># &amp; Composition of Vendor Employees &amp; Consultants Assigned:</b></p>	<p>Vendor Project Manager – Yuri Nisenzon            Key Consultants on Project Team: Yuri Nisenzon, Melissa Rasman, Saul Lazarus, Justin Frerich, Ester Driessen</p>
<p><b>Client Contact Information:</b></p>	<p><b>Reference Contacts:</b></p> <p>Name: Charles Derderian            Title: Manager, Employee Benefits            Department: Human Resources            Full Address: 4 World Trade Center, 150 Greenwich Street, 16<sup>th</sup> Floor, New York, NY 10007            Telephone: (212)435-2848-6900            E-mail: cderderi@panynj.gov            Relation/Role to Project: Project Budget Manager</p> <p>Name: Donna Dantzler            Title: Employee Benefits Executive            Department: Human Resources            Full Address: 4 World Trade Center, 150 Greenwich Street, 16<sup>th</sup> Floor, New York, NY 10007            Telephone: (212)435-2864            E-mail: ddantzle@panynj.gov            Relation/Role to Project: Project Manager</p>



### *Client Experience – Local Governments*

In the local government arena, once again, Hay Group's proposed team members for SERS have been actively involved with actuarial services both as system actuaries and in actuarial audit or support capacities for a large number of public entities.

For the City of New York Office of the Comptroller, in 2012, Hay Group completed an extensive 3+ year actuarial audit of all five New York City Retirement Systems (NYCRS). NYCRS cover about 700,000 members (active and retired), with over \$100 billion in assets. This assignment included audit of the contribution development, a comprehensive experience study and review of the City's administrative procedures. Our audit team included proposed team members Mowery, Graby, Nisenzon, Puri and Schoener.

Having seen our Hay Group team in action during the audit, the New York City Office of Management and Budget (OMB) became interested in our services and in 2014, engaged Hay Group (Mowery, Graby, McPhillips, Nisenzon and Schoener) to provide them ongoing actuarial analysis and support services under a three-year contract.

Our proposed team members serve as system actuaries for dozens of other local governments. Project Reference forms follow for these three examples:

- City of Wilkes-Barre, PA,
- City of Rockville, MD and
- City of Newport, RI.





<b>Name of Client &amp; Project Title</b>	City of Wilkes-Barre, PA – Police, Fire and Non-Uniformed Actuarial Valuations, Governmental Accounting Compliance, Post-Retirement Medical Valuations, Experience Studies, Periodic Cost Projections, and Annual Benefit Cash Flow Projections	
<b>Contract Value</b>	Approximately \$50,000	
<b>Nature and Scope of Project:</b>	<p>The City of Wilkes Barre has, for many years, relied upon Hay Group to handle a variety of ongoing pension actuarial services, including:</p> <ul style="list-style-type: none"> <li>▪ Biennial valuations of the liabilities and recommended contributions</li> <li>▪ Periodic analysis of experience for use in revising valuation assumptions</li> <li>▪ Assistance with accounting disclosure requirements and compliance with GASB Standards</li> <li>▪ Periodic cost projections</li> <li>▪ Annual benefit cash flow projections</li> <li>▪ Biennial valuations of the City's Post-Retirement Medical Plans</li> <li>▪ Act 111 Arbitrations and Expert Witness</li> <li>▪ Allocation of Cost between City, State and Employee</li> </ul> <p>The City is smaller than SERS in size, but the City's pension plans are complex in that there are different plan provisions for each group (Police, Fire and Non-Uniformed) and, within each group, other differences dependent upon date of hire. In fact, five separate actuarial valuation reports are performed for the City.</p>	
<b>Project Duration:</b>	Start Date Year: Current contract = 2015	End Date Year: Ongoing
<b>Nature of the Client:</b>	The work performed is for the City of Wilkes-Barre, PA.	
<b>Nature of Client Audience:</b>	The City valuation results are used for financial reporting requirements by finance and audit staff. The results are also submitted to the Pennsylvania Public Employees Retirement Commission & the Plans are audited by the Pennsylvania Department of the Auditor General.	
<b>Number of Users:</b>	There are currently over 1,000 active and inactive members of the retirement plans.	
<b># &amp; Composition of Vendor Employees &amp; Consultants Assigned:</b>	Vendor Project Manager/Key Consultant on Project Team: The City project is managed by Jason Fine. The remaining team on the project includes another proposed SERS team member, Greg Schoener.	
<b>Client Contact Information:</b>	Reference Contacts:	



Mr. Brett Kittrick  
Finance Officer  
City of Wilkes-Barre  
40 East Market Street  
Wilkes-Barre, PA 18711  
Telephone: (570) 208-4134  
E-mail: [bkittrick@Wilkes-Barre.pa.us](mailto:bkittrick@Wilkes-Barre.pa.us)  
Relation/Role to Project: Finance Manager

Ellen Meehan  
Human Resources  
Human Resources Director  
Telephone: 570-208-4173  
E-mail: [emeehan@wilkes-barre.pa.us](mailto:emeehan@wilkes-barre.pa.us)



<b>Name of Client &amp; Project Title</b>	City of Rockville, Maryland	
<b>Contract Value</b>	\$30,000 per year	
<b>Nature and Scope of Project:</b>	<p>The scope of the work covers three broad areas:</p> <ul style="list-style-type: none"> <li>• Pension valuation</li> <li>• OPEB valuation</li> <li>• Consulting services covering employee benefit programs</li> </ul>	
<b>Project Duration:</b>	<b>Start Date Year:</b> 2011	<b>End Date Year:</b> Ongoing
<b>Nature of the Client:</b>	Municipality in Maryland	
<b>Nature of Client Audience:</b>	Hay Group has served as the actuary for the City of Rockville since 2011. Duties include annual pension valuations including the new GASB 67/68 results, an experience study, special studies for modified plans covering new entrants, and assistance with union negotiations. Hay Group also performs biannual OPEB valuations and analysis.	
<b>Number of Users:</b>	Approximately 500 active members and 300 retirees and separated members are covered by the pension plan.	
<b># &amp; Composition of Vendor Employees &amp; Consultants Assigned:</b>	Vendor Project Manager – Craig Graby Key Consultants on Project Team: Jared Grove and Sanjit Puri	
<b>Client Contact Information:</b>	<p><b>Reference Contacts:</b></p> <p>Name: Gavin Cohen  Title: Director of Finance  Department: Finance Department  Full Address: 111 Maryland Ave., Rockville, MD 20850  Telephone: (240)314-8400  E-mail: gcohen@rockvillemd.gov  Relation/Role to Project: Project Manager</p>	



<b>Name of Client &amp; Project Title</b>	City of Newport, Rhode Island	
<b>Contract Value</b>	\$30,000 per year	
<b>Nature and Scope of Project:</b>	<p>The scope of the work covers three broad areas:</p> <ul style="list-style-type: none"> <li>• Pension valuation</li> <li>• OPEB valuation</li> <li>• Consulting services covering employee benefit programs</li> </ul>	
<b>Project Duration:</b>	<b>Start Date Year:</b> 2012	<b>End Date Year:</b> Ongoing
<b>Nature of the Client:</b>	Municipality in Rhode Island	
<b>Nature of Client Audience:</b>	Hay Group has served as the actuary for the City of Newport since 2012. Duties include annual pension valuations including the new GASB 67/68 results, an experience study, and special studies for plan changes covering new entrants. Hay Group also performs annual OPEB valuations and analysis.	
<b>Number of Users:</b>	Approximately 400 active members and retirees/beneficiaries are covered by the pension plan and 1,100 active and inactive members in the OPEB plan.	
<b># &amp; Composition of Vendor Employees &amp; Consultants Assigned:</b>	<p>Vendor Project Manager – Brent Mowery</p> <p>Key Consultants on Project Team: Craig Graby, Greg Schoener, Jim McPhillips, Jared Grove and Sanjit Puri</p>	
<b>Client Contact Information:</b>	<p><b>Reference Contacts:</b></p> <p>Name: Laura Sitrin</p> <p>Title: Director of Finance</p> <p>Department: Finance Department</p> <p>Full Address: 43 Broadway, Newport, RI 02840</p> <p>Telephone: (401)845-5394</p> <p>E-mail: Isitrin@cityofnewport.gov</p> <p>Relation/Role to Project: Project Manager</p>	



Hay Group also serves as the actuary for the retirement plans of a large number of local and county governments in Pennsylvania, including 50 of the 67 counties in the Commonwealth. We prepare the actuarial valuations for these clients and review plan experience to determine how best to project costs in the future. We also assist them in anticipating and reacting to changes in local, state and Federal legislation that affect their retirement systems. Our services for many of these governmental bodies include compensation comparisons and ongoing assistance with compensation and benefits related communications to members.

Project Reference Forms follow for three of the Pennsylvania counties for whom Hay Group performs the above-described actuarial services:

- Bucks County,
- Dauphin County and
- Westmoreland County



<b>Name of Client &amp; Project Title</b>	Bucks County, Pennsylvania – Pension Valuations	
<b>Contract Value</b>	\$40,608 for 2015	
<b>Nature and Scope of Project:</b>	<p>Prepare annual actuarial valuation of the Bucks County Employees' Retirement System as required by Pennsylvania's County Pension Law, and separate valuation for GASB-required disclosures.</p> <p>Prepare annual estimate of funding requirements for ensuing year and the funding requirements for cost-of-living increases for pensions. Also, prepare Commonwealth of Pennsylvania Actuarial Investigative Reports as required by law, for review and certification by the county.</p> <p>Furnish pension calculations for individual participants.</p> <p>Consult and prepare cost-impact analyses of pension changes, as requested.</p> <p>Prepare individual employee benefit statements for all active participants.</p> <p>Prepare Retirement System restatement, and amendments as required. Submitted plan to IRS for determination letter.</p>	
<b>Project Duration:</b>	<b>Start Date Year:</b> 1942	<b>End Date Year:</b> on-going
<b>Nature of the Client:</b>	County of Pennsylvania	
<b>Nature of Client Audience:</b>	Retirement Board, plan administrators, and plan participants	
<b>Number of Users:</b>	3,928 plan members for 2015 valuation report	
<b># &amp; Composition of Vendor Employees &amp; Consultants Assigned:</b>	Team of 4 assigned to the project, including proposed SERS team member, David Reichert	
<b>Client Contact Information:</b>	<p><b>Reference Contacts:</b>  Name: Ms. Kimberly S. Doran  Title: Acting Controller  Department: Controller  Full Address: Bucks County Admin Bldg  55 East Court Street Doylestown, PA 18901  Telephone: (215) 348-6452  E-mail: ksdoran@co.bucks.pa.us  Relation/Role to Project: Secretary of Retirement Board</p>	





<b>Name of Client &amp; Project Title</b>	Dauphin County, Pennsylvania – Pension and OPEB Valuations	
<b>Contract Value</b>	\$39,600 for 2015 retirement plan, \$12,500 bi-annually for OPEB	
<b>Nature and Scope of Project:</b>	<p>Prepare annual actuarial valuation of the Dauphin County Employees' Retirement System as required by Pennsylvania's County Pension Law, and separate valuation for GASB-required disclosures.</p> <p>Prepare annual estimate of funding requirements for ensuing year and the funding requirements for cost-of-living increases for pensions. Also, prepare Commonwealth of Pennsylvania Actuarial Investigative Reports as required by law, for review and certification by the county.</p> <p>Prepare other post-employment benefit obligations (OPEB) valuation and GASB-required disclosures.</p> <p>Furnish pension calculations for individual participants.</p> <p>Consult and prepare cost-impact analyses of pension changes, as requested.</p> <p>Prepare individual employee benefit statements for all active participants.</p> <p>Prepare Retirement System restatement, and amendments as required. Submitted plan to IRS for determination letter.</p>	
<b>Project Duration:</b>	<b>Start Date Year:</b> 1959	<b>End Date Year:</b> on-going
<b>Nature of the Client:</b>	County of Pennsylvania	
<b>Nature of Client Audience:</b>	Retirement Board, plan administrators, and plan participants	
<b>Number of Users:</b>	2,779 plan members for 2015 valuation report	
<b># &amp; Composition of Vendor Employees &amp; Consultants Assigned:</b>	Team of 4 assigned to the project, including proposed SERS team member, David Reichert	
<b>Client Contact Information:</b>	<p><b>Reference Contacts:</b>  Name: Mr. Timothy L. DeFoor  Title: Controller  Department: Controller  Full Address: Dauphin County Court House  101 Market Street, Room #106  Harrisburg, PA 17109-2091  Telephone: (717) 780-6570  E-mail: tdefoor@dauphine.org  Relation/Role to Project: Secretary of Retirement Board</p>	



<b>Name of Client &amp; Project Title</b>	Westmoreland County, Pennsylvania – Pension and OPEB Valuations	
<b>Contract Value</b>	\$39,600 for 2015 retirement plan, \$12,500 for 2015 OPEB plan	
<b>Nature and Scope of Project:</b>	<p>Prepare annual actuarial valuation of the Westmoreland County Employees' Retirement System as required by Pennsylvania's County Pension Law, and separate valuation for GASB-required disclosures.</p> <p>Prepare annual estimate of funding requirements for ensuing year and the funding requirements for cost-of-living increases for pensions. Also, prepare Commonwealth of Pennsylvania Actuarial Investigative Reports as required by law, for review and certification by the county.</p> <p>Prepare other post-employment benefit obligations (OPEB) valuation and GASB-required disclosures.</p> <p>Furnish pension calculations for individual participants.</p> <p>Consult and prepare cost-impact analyses of pension changes, as requested.</p> <p>Prepare individual employee benefit statements for all active participants.</p> <p>Prepare Retirement System restatement, and amendments as required. Submitted plan to IRS for determination letter.</p>	
<b>Project Duration:</b>	<b>Start Date Year:</b> 1945	<b>End Date Year:</b> on-going
<b>Nature of the Client:</b>	County of Pennsylvania	
<b>Nature of Client Audience:</b>	Retirement Board, plan administrator, and plan participants	
<b>Number of Users:</b>	3,203 plan members for 2015 valuation report	
<b># &amp; Composition of Vendor Employees &amp; Consultants Assigned:</b>	Team of 4 assigned to the project, including proposed SERS team member, David Reichert	



**Client Contact Information:**

**Reference Contacts:**

Name: Mr. Jeffrey Balzer                      Title: Controller  
Department: Controller  
Full Address: Westmoreland County Court House  
2 North Main Street, Suite 111  
Greensburg, PA 15601

Telephone: (724) 830-3142                      E-mail:  
cpedicon@co.westmoreland.pa.us  
Relation/Role to Project: Secretary of Retirement Board

Name: Mr. Regis Garris                      Title: Chief Deputy  
Controller  
Department: Controller  
Full Address: Westmoreland County Court House  
2 North Main Street, Suite 111  
Greensburg, PA 15601

Telephone: (724) 830-3776                      E-mail:  
rgarris@co.westmoreland.pa.us  
Relation/Role to Project: administrator



### *Experience with Actuarial Expert Testimony*

It is also important to note that several of Hay Group's proposed senior SERS team members have experience providing actuarial expert testimony before retirement boards, regulatory commissions and in trial proceedings.

In connection with significant pension funding challenges facing SERS in the aftermath of the 2008 economic downturn, Mr. Mowery testified before two legislative bodies of the Commonwealth of Pennsylvania during public hearings held in March and April of 2010. He responded primarily to questions regarding the impact of past legislative changes and the likely impact of potential future legislative changes to the provisions of SERS.

Mr. Mowery has also provided extensive actuarial expert testimony over the past ten years relating to the Pennsylvania Workers' Compensation program and how benefits thereunder integrate with SERS disability retirement benefits.

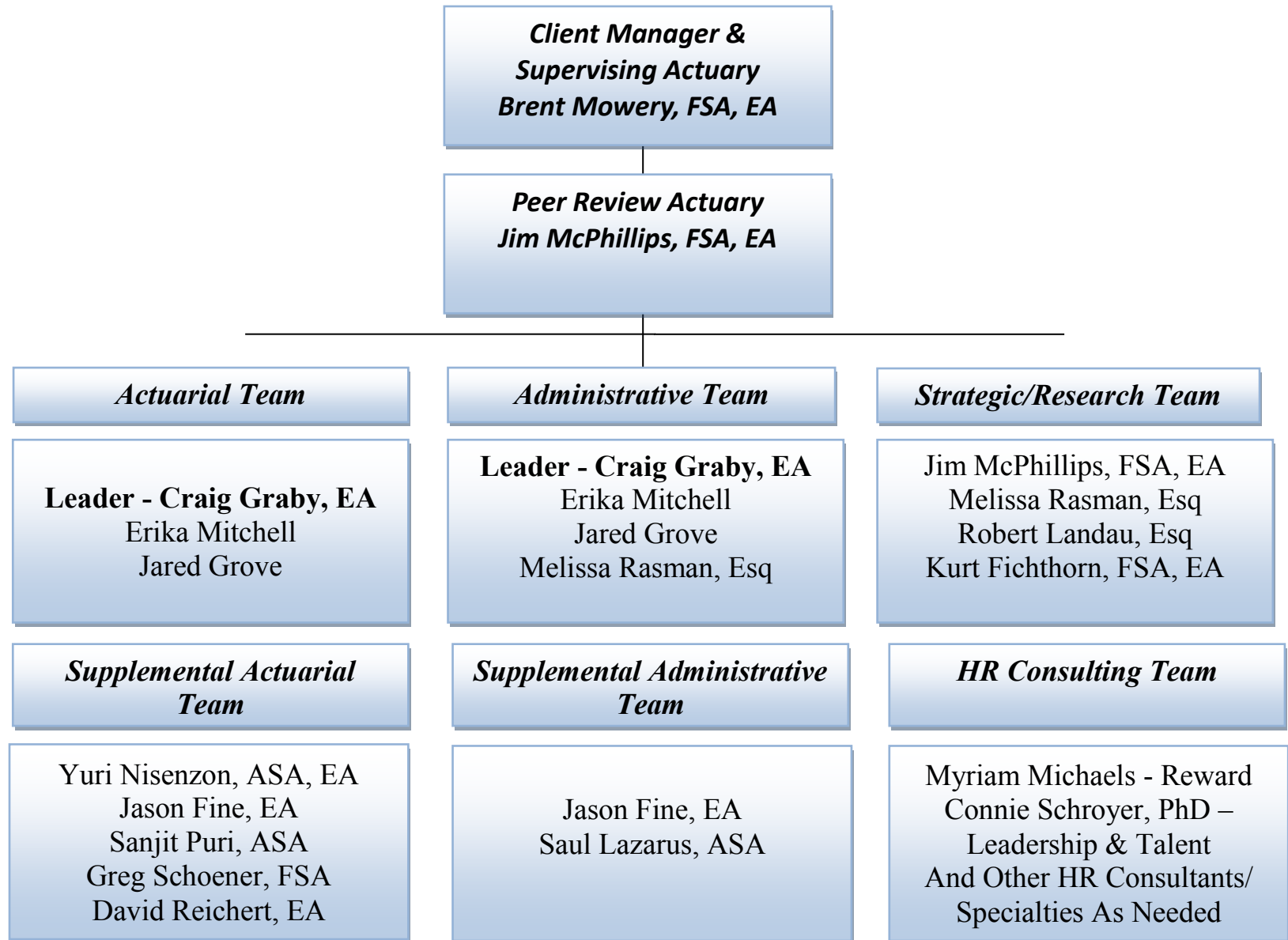
As well, as described in the State of Maryland Project Reference included earlier in this section, Mr. Mowery provided (five to ten years ago) significant independent review and actuarial expert reports and testimony relating to errors performed by a former actuary for the State of Maryland.



## V. Personnel

The consulting team Hay Group is proposing to SERS, most importantly, will continue to be led by Brent Mowery, the current Client Manager and Supervising Actuary, Craig Graby, the current Actuarial and Administrative Team Leader, and Jim McPhillips, the current Peer Review Actuary. Brent, Craig and Jim are three highly qualified senior actuaries who have so ably served SERS through the current contract period and, in the case of Brent and Craig, for at least the past 16 years. Under their leadership, Hay Group will continue to provide the full range of actuarial consulting services that is essential to successfully operate one of the most complex retirement systems in the United States. It is also important to note that our proposed team includes eight other Hay Group actuaries, attorneys, and consultants who have successful past experiences on the SERS engagement.

The structure of our proposed SERS team is shown in the chart on the following page.





As you can see, we have organized our SERS team into three principal teams (the Actuarial Team, the Administrative Team, and the Strategic/Research Team). Both the Actuarial Team and the Administrative Team have Supplemental Teams, to provide additional support during periods of peak demand. In addition, we have available a broad HR Consulting Team that can provide additional reward, leadership and talent consulting expertise to SERS in its capacity as an employer.

In our Personnel Experience by Key Position (below) we have identified four key positions. They are:

- Brent Mowery, Client Manager & Supervising Actuary
- Craig Graby, Leader-Actuarial Team and Leader-Administrative Team
- Jim McPhillips, Peer Review Actuary & Co-Leader Strategic/Research Team
- Melissa Rasman, Co-Leader Strategic/Research Team

These named consultants are the Hay Group employees who will not be replaced as SERS team members without communication of such action to SERS for review and approval. However, please note that all of the other employees referenced in the above organization chart are fully qualified and available to work on any SERS request.



### PERSONNEL EXPERIENCE BY KEY POSITION

		Indicate Number of Years of Experience in Each Applicable Category Below				Committed Full Time? (Percentage must be given for any part-time resources)
Key Positions	Personnel Name	Previous Experience with Actuarial Valuations, Experience Studies, Special Projects/Reviews and Consulting Services to Large Public Pension Plans	Availability Experience with other Actuarial Valuations, Experience Studies, Special Projects/Reviews and Consulting Services to Large Public Pension Plans	Previous Other Relevant Experience (Briefly Specify)	Previous Experience Proposed Role	
Client Manager & Supervising Actuary	Brent Mowery	More than 16 years of experience, including SERS actuarial valuations and experience studies, analysis of legislative changes, and funding strategies.	More than 40 years	More than 40 years of experience with medium to large pension plan actuarial valuations, experience studies and special projects, including plans sponsored by both public and private employers.	Brent has served as the SERS Supervising Actuary for the past 16 years. He also has served as the supervising actuary for many large pension plan engagements.	Yes
Leader - Actuarial Team and Leader - Administrative Team	Craig Graby	More than 19 years of experience, including SERS actuarial valuations and experience studies, analysis of legislative changes, funding strategies, administrative procedures, and benefit calculations (including DROs).	More than 19 years	More than 23 years of experience with medium and large pension plans' actuarial valuations, experience studies and special projects, including audits of large governmental plans.	Craig has served in roles of increasing responsibility for SERS, and has served for the past 10 years in leading both our Actuarial and Administrative Teams for SERS.	Yes

### PERSONNEL EXPERIENCE BY KEY POSITION

		Indicate Number of Years of Experience in Each Applicable Category Below				Committed Full Time? (Percentage must be given for any part-time resources)
Key Positions	Personnel Name	Previous Experience with Actuarial Valuations, Experience Studies, Special Projects/Reviews and Consulting Services to Large Public Pension Plans	Availability Experience with other Actuarial Valuations, Experience Studies, Special Projects/Reviews and Consulting Services to Large Public Pension Plans	Previous Other Relevant Experience (Briefly Specify)	Previous Experience Proposed Role	
Peer Review Actuary & Co-Leader Strategic/Research Team	Jim McPhillips	More than 20 years of experience with actuarial valuations, experience studies, costing studies, plan redesign, and funding strategies.	More than 25 years	Over 25 years of experience with pension plans sponsored by private employers, including work with Fortune 500 companies.	Jim has served as the SERS Peer Review Actuary and Co-Leader of the Strategic/Research Team for the past 3 years. Over that same time period, he has also served as lead actuary for several large national churches and provided actuarial peer review for the pension plans of a large city.	Yes
Co-Leader Strategic/Research Team	Melissa Rasman	More than 32 years of experience providing compliance advice to clients, including more than 20 years of advising SERS on complex tax and compliance questions.	More than 20 years	More than 32 years of providing a full range of compliance advice with respect to applicable Federal and State law relating to retirement plans and other employee benefits matters.	Melissa has been providing consulting advice to SERS for more than 20 years, and she continues to provide critical analysis on a host of compliance issues.	Yes



To illustrate the significant depth of relevant capabilities and experience available from Hay Group's proposed team for SERS, we provide below a brief summary which identifies, by each of four major service areas that will/may be needed by SERS, the number of professionals on our proposed team who we can call upon to respond to SERS' needs:

- When Actuarial Valuation Services are Needed: 11 members of Hay Group's proposed team have the capability and availability to respond
- When Actuarial Experience Study Services are Needed: 11 members of Hay Group's proposed team have the capability and availability to respond
- When Other Actuarial/Benefits Consulting Services (Special Actuarial Projects) Need to be Performed: 8 members of Hay Group's proposed team have the capability and availability to respond
- When HR Consulting Services are Needed: 2 members of Hay Group's proposed team have the capability and availability to respond; however, many others can and will be made available as needed

In further support of the qualifications of the Hay Group consultants who we have selected for our proposed SERS team, we have included in the pages that follow, a resume for each of our proposed team members.

## Brent Mowery



### Overview

*Brent Mowery is a Senior Principal in Hay Group's Metro Washington, DC office. Mr. Mowery is an experienced employee benefits consultant with significant expertise in design, financial, and risk-related considerations of employee benefit and compensation programs. He is a Fellow of the Society of Actuaries and has consulted extensively with clients regarding their retirement programs.*

### Delivering results for clients

Mr. Mowery's most recent Hay Group experience includes:

- Account manager and senior consulting actuary for the pension plans for the following Hay Group clients: State Employees' Retirement System (covering employees of the Commonwealth of Pennsylvania); National Oceanic & Atmospheric Administration (US Department of Commerce); US Public Health Service (US Department of Health and Human Services), the US Department of State (with respect to programs covering officers of the US Foreign Service) and the Comptroller General's Retirement System (US Government Accountability Office).
- Account manager and senior consulting actuary: (i) leading annual actuarial audit (since 2013, as part of the independent annual financial audit) of the U.S. Military Retirement Fund, the pension fund covering all current and former members of the U.S. Military, and (ii) leading Hay Group's ongoing actuarial analysis and support services provided to the New York City Office of Management and Budget (OMB).
- Senior consulting actuary leading the 2013 and 2014 actuarial audits (as a part of the independent annual financial audit) of the Pension Benefit Guaranty Corporation's annual financial statements/reports.
- Senior consulting actuary responsible for senior level review/certification or peer review of pension actuarial valuations and/or other pension actuarial analyses for (i) US Coast Guard (US Department of Homeland Security), (ii) Metropolitan Washington Airports Authority pension plans, (iii) Pension Plan of Athens-Clarke County and Pension Plan of Chatham County (State of Georgia), (iv) Police and Fire Pension Systems of the City of Newport, Rhode Island and (v) the Campus Crusade for Christ, Inc. retirement plan.
- Senior consultant on multi-year audit (2008 to 2012) of in-house actuarial work performed by the City of New York Office of the Actuary, with responsibility for performance of actuarial experience studies to review appropriateness of actuarial valuation assumptions.

## Areas of expertise

Prior to joining Hay Group, Mr. Mowery was a Managing Consultant with Mobil Corporation, where he was responsible for creating a new team in corporate HR aimed at utilizing coalitions of companies to negotiate more favorable employee benefit coverages than Mobil could obtain on its own. He led a team of senior benefits professionals through two highly successful coalition purchasing initiatives:

- Launched a new coalition of companies to purchase long-term care insurance; convinced 34 Fortune 500 companies (representing over one million covered lives) to participate with Mobil in a group RFP; ultimately obtained exceptional terms and rates from the selected insurance carrier, surpassing by far the expectations of Mobil and the other 34 companies
- Undertook marketing campaign to expand prescription drug coalition; increased corporate membership from 9 to 15 companies to strengthen the coalition and protect Mobil's interests in the arrangement

With over 40 years of actuarial consulting experience, Mr. Mowery has also held senior level consulting positions with William M. Mercer (Washington, DC), Aon Consulting (New York, NY) and Coopers & Lybrand (New York, NY). These positions presented him with opportunities to:

- Analyze retirement program adequacy for a Fortune 500 diversified industrial client and lead strategy sessions with worldwide human resources personnel
- Analyze benefit plans in connection with corporate restructurings, mergers and acquisitions to identify costs/liabilities and to clarify responsibilities of the parties
- Perform cost analyses for diversified industrial client with more than 20 pension plans to adopt a single, uniform pension plan, identifying significant annual savings

## Brent's Education and Affiliations

Mr. Mowery received his MS (Statistics) and BA (Mathematics) degrees from the University of Iowa.

He is a Fellow of the Society of Actuaries, Member of the American Academy of Actuaries and an Enrolled Actuary under ERISA. Mr. Mowery has also been active in the Middle Atlantic Actuarial Club, a multi-state organization of actuaries, having served as club President 1999-2000.

## Contact

Email: [Brent.Mowery@haygroup.com](mailto:Brent.Mowery@haygroup.com)

Tel: 1-703-841-3109

## Craig Graby



### Overview

*Craig Graby is a Principal of the Hay Group's Benefits Practice in the Washington, DC office. His major emphasis is actuarial pension plan consulting and benefit plan design to the governmental sector. Craig has over twenty-three years of experience in the employee benefits consulting field, and has provided services to clients of varying sizes and industries. For the last twenty years, Craig has focused primarily on public sector actuarial valuations for Federal, State, County and Local governments.*

### Delivering results for clients

Craig's recent Hay experience includes:

- Actuarial valuation and cost analysis work for the Pennsylvania State Employees' Retirement System including the impact of changing benefits for current members and new hires.
- Development of a comprehensive contribution projection model for the Pennsylvania State Employees' Retirement System.
- Periodic economic and demographic experience study analysis for governmental employers.
- Development of new accounting results required under GASB 67 and 68, including single employer plans and cost-sharing multiple employer plans that require detailed calculations at the contributing employer level.
- Valuation of defined benefit pensions for County, State, Federal, and private sector clients.
- Replication audits of some of the largest governmental pension plans in the world including the Federal civilian systems (FERS and CSRS) and the New York City systems.
- Development of comprehensive population projection models for various government clients. The projections were used to analyze workforce trends in their respective populations.
- Analysis of experience and assumptions and their effects on funding, FASB, and GASB costs.
- Auditing of DoD Office of the Actuary liabilities for the Military Retirement Fund portion of the DoD financial statements, including a partial replication.

- Auditing of pension and post-retirement work to ensure compliance with Federal requirements and generally accepted actuarial standards, including a 2013 and 2014 actuarial audit (as a part of the independent annual financial audit) of the Pension Benefit Guaranty Corporation's annual financial statements/reports.
- Primary contact providing data, assumptions, and provisions to firms performing actuarial audits on certain Hay clients.
- Risk modeling for a large municipal government that was used to structure a new tier of benefits that created a sustainable plan and reduced the government's future risk.

### **Craig's Education and Affiliations**

Craig Graby holds a BS from Penn State University where he majored in Mathematics with an Actuarial Science option. Mr. Graby is an Enrolled Actuary under ERISA, a Fellow of the Conference of Consulting Actuaries, and a Member of the American Academy of Actuaries.

### **Contact**

Email: [Craig.Graby@haygroup.com](mailto:Craig.Graby@haygroup.com)

Tel: 1-703-841-3142

Mobile: 1-703-389-6368



## Jim McPhillips



### Overview

*Jim is a Principal in Hay Group's Philadelphia Office and leads the retirement consulting portion of the Benefits Practice in the US. He is a Fellow of the Society of Actuaries and an Enrolled Actuary. His responsibilities include the management and delivery of benefits consulting services to clients in all industry sectors.*

### Delivering results for clients

Jim assists his clients with a broad range of retirement plan funding, design and compliance issues. Many clients rely on him to help them understand the cost and accounting impact of implementation alternatives. They are also advised on the advantages and disadvantages of each option. With a full understanding of the issues, plan sponsors make choices that are best for their organization, employees and retirees.

In addition to providing service to many public and private sector clients, Jim is the lead actuary on consulting services offered by Hay Group to church pension plan sponsors.

#### Areas of expertise

- Pension Plan design, funding and accounting
- Postretirement Medical and Life Insurance Benefit design, accounting and funding
- Attestation for prescription drug plan sponsors applying for Medicare Part D reimbursement
- Employee Stock Option Plan accounting
- Executive Retirement benefit design and accounting
- Plan funding and market comparison studies;
- Benefit program compliance and administration reviews;
- Nondiscrimination testing for benefit plans including defined benefit, defined contribution and dependent day care plans;
- Benefit program consolidation studies including plan termination studies;
- Merger and acquisition analysis of benefit plan

Combining actuarial expertise with experience allows Jim to present clients with consulting advice that assists them in designing and operating the benefit plans that serve their organization objectives most appropriately.

Jim has worked for the Centers for Medicare & Medicaid Services reviewing bids submitted by Medicare Advantage (MA) and Prescription Drug Plan (PDP) sponsors. He has provided expert actuarial litigation support with regard to pension and retiree medical benefit valuations

related to bankruptcy proceedings. He has also presented at arbitration hearings regarding present value of Social Security and pension benefits.

### **Jim's Education and Affiliations**

Jim holds a Bachelor of Science of Economics degree in actuarial science and insurance from the Wharton School of the University of Pennsylvania. He is a Fellow of the Society of Actuaries, an Enrolled Actuary, and a Member of the American Academy of Actuaries.

### **Contact**

Email: [jim.mcphillips@haygroup.com](mailto:jim.mcphillips@haygroup.com)

Tel: 215.861.2713

## Melissa Rasman



### Overview

*Melissa Rasman is a Senior Principal based in our Philadelphia office and heads the Research Group for Hay Group's U.S. Benefits Practice. Melissa works with employers to develop, implement and administer employee and executive benefits and reward programs that help motivate and retain employees and executives and comply with all applicable legal requirements..*

### Delivering results for clients

Melissa consults with a wide range of organizations, including public and privately-held businesses, tax-exempt organizations and governmental entities of all sizes.

Melissa regularly helps clients to understand and address the key statutory and regulatory requirements that affect their employee benefits and reward programs. Melissa also helps clients to develop, implement and administer qualified retirement plans and non-qualified deferred compensation arrangements, health and welfare plans, flexible benefits plans and fringe benefit plans.

As head of the Research Group for the U.S. Benefits Practice, Melissa monitors and analyzes legislative, regulatory and other legal developments affecting employee benefit plans and compensation arrangements for Hay Group Benefits and Reward consultants, to ensure that our consulting advice reflects all current requirements. She keeps Hay Group clients informed of the most important developments in her role as editor-in-chief of, and a principal writer for, the Hay Group Benefits Alerts, a series of brief papers on benefits developments of interest to human resources managers and line executives

### Areas of expertise

Melissa's expertise includes: developing, implementing and administering broad-based employee benefit programs, including qualified pension, profit sharing, and 401(k) plans, tax-sheltered annuity programs, health and welfare plans, flexible benefits plans and fringe benefit plans; designing and implementing executive benefits and compensation arrangements, including nonqualified deferred compensation arrangements, short and long-term incentive plans, employment agreements, and other executive benefits; drafting employee benefit and executive compensation plans and arrangements; and compliance with U.S. tax law, ERISA, COBRA, HIPAA, PPACA, FMLA, FLSA, and non-discrimination laws affecting employee benefits and compensation plans.

## **Melissa's Education and Affiliations**

Before joining Hay Group, Melissa practiced law for 12 years at Dechert LLP and Ballard Spahr LLP, two major law firms headquartered in Philadelphia, where she specialized in tax and employee benefits law.

Melissa received her JD magna cum laude from the University of Michigan Law School in 1983, an MA in English from the University of Virginia Graduate School of Arts and Sciences in 1978, and a BA in literature from Bennington College in 1976.

Melissa has published articles in the Journal of Compensation and Benefits, Benefits and Compensation Solutions, HealthLeaders Media, and the Journal of Taxation of Exempt Organizations.

Melissa is licensed to practice law in the Commonwealth of Pennsylvania.

## **Contact**

Email: [Melissa.rasman@haygroup.com](mailto:Melissa.rasman@haygroup.com)

Tel: 215-861-2350

## Jason Fine



### Overview

*Jason is a Senior Consultant of the Hay Group's Benefits Practice in the Philadelphia office. His major emphasis is actuarial pension plan and post-retirement medical valuations.*

### Delivering results for clients

Jason performs daily consulting and keeps clients informed of proposed changes in legislation. Making sure that clients are aware of changes that could impact their plan, so that there are no surprises, are his number one priority.

### Areas of expertise

Jason has over eighteen years of experience in the employee benefits consulting field, and has provided services to clients of varying sizes and industries. His experience includes:

- Annual valuations of pension plans including cash balance and pension equity plans;
- Post-retirement and post-employment valuation;
- Analysis of ASC 715 (formerly FASB 87/88/132) including determination of pension expense, settlements, curtailments, and financial disclosure;
- Accounting under GASB, US GAAP, IAS 19 and FRS 17;
- Analysis of experience and assumptions and their effects on funding and expense;
- Determination of liabilities and pension expense for supplemental executive retirement plans;
- Government filings;
- Automated benefit calculation programs and benefit statements;
- Plan terminations, acquisitions and mergers;
- Plan design alternatives to reduce cost and/or volatility; and
- Non-discrimination testing.

### Jason's Education and Affiliations

Jason holds a BS from Temple University where he majored in Actuarial Science. He has met the requirements for enrollment under ERISA and is an enrolled actuary under the Joint Board for Enrollment of Actuaries. Jason is also a member of the American Academy of Actuaries, a Fellow of the Conference for Consulting Actuaries and is currently working towards the Associate designation within the Society of Actuaries.

### Contact

Email: [Jason.Fine@haygroup.com](mailto:Jason.Fine@haygroup.com)

Tel: (215) 861-2474

## Yuri Nisenzon



### Overview

*Yuri Nisenzon is a Senior Principal in Hay Group's Metro New York Office. Yuri has over 20 years of experience as a benefits consultant, and specializes in employee benefits including retirement, health and post-retirement medical. Yuri helps clients to design, administer and evaluate competitive benefit programs to provide employees with comprehensive benefits at manageable cost.*

### Delivering results for clients

Yuri provides consulting service with a wide range of US and international companies, including private, public and non-for-profit organizations. These include, among others, United States Postal Service, Centers for Medicare and Medicaid Services, NJ Department of Banking and Insurance, Banco Santander Central Hispano US Offices, Port Authority of New York and New Jersey

Yuri's principal role is to act as leading day-to-day consultant for the client, provide broad technical expertise related to different benefit program design, maintenance, evaluation and administration, to comply with Internal Revenue Code (US), Affordable Care Act (ACA), Financial and Government Accounting Standard Boards (FASB and/or GASB) rules, and IAS19 International Accounting rules, and helping private and public entities to evaluate the impact from the different aspects of the evolving healthcare reform.

Yuri played a key role in conducting the successful audit of the Civil Service Retirement System (CSRS), Federal Employee Retirement System (FERS) and New York City Employees Retirement Systems (NYCERS). Yuri was hired to provide the necessary technical expertise and expert witness report by different law firms to support the litigation cases involved the proper setting of the actuarial assumptions, calculations of the actuarial liability in accordance with different statutory requirements and interpretation of the plan documents. Yuri manages benefit department work load, he is responsible for meeting all deadlines. He participates and leads the responses to RFP's, as well as client presentations.

Yuri was one of the key contributors in the assisting the Department of Banking and Insurance (DOBI) of the State of New Jersey to redesign their process for reviewing health insurance premium rate filings. In this engagement he was part of the team evaluating the existing DOBI review standards and processes specific to health insurance and developing specific recommendations for DOBI on ways to improve the review standards and processes, meet HHS reporting requirements, and make information more available and accessible for the

public. Yuri was one of the actuaries who developed a comprehensive actuarial study of the state's health insurance rate filing and approval process leading to recommendations for improvements and/or redesign of the process, and database to capture data from the rate filings and support analysis and reporting on the rate filings.

Yuri is a Project Director leading Hay Group actuarial team in the review for the Centers for Medicare and Medicaid Services (CMS) of the reasonableness of 2013-2015 MA-PD and PDP plan bid review and audit. Yuri participated in CMS bid review project since it's origination in 2005, and he was a team leader on the 2007 - 2009 plan bids actuarial audit projects. The bid review is focusing on the evaluation of whether or not proposed bid is reasonable and fair to the bid sponsor, the beneficiary and CMS. The process requires in depth review of the allowed cost, administrative expense (including Sales and Marketing expense) and profit margin, and the review of all actuarial assumptions and methods used in developing the overall bid.

### **Areas of expertise**

Yuri has a broad expertise in all areas of health, pension and post-retirement medical benefits, commercial and Medicare health rates review. He is an expert in Pension and Health Benefit Regulation, IRS compliance rules as they apply to private and public companies benefit programs, employee benefit nondiscrimination rules.

### **Yuri's Education and Affiliations**

Yuri has worked for Hay Group for eleven years. Prior to that he was an Actuarial Associate in the corporate actuarial department of the Segal Company; a visiting scientist in the Department of Electrical and Electronic Engineering of Drexel University, PA.

Yuri has a PhD in Mathematics from Moscow State University (Russia), and a MA in Computer Science from Moscow Institute of Steel and Alloys (Russia). Yuri is an Associate of the Society of Actuaries, Enrolled Actuary with US Internal Revenue Service, Member of American Academy of Actuaries and Fellow of the Conference of Consulting Actuaries.

### **Contact**

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## Saul Lazarus



### Overview

*Saul is a Hay Group consultant based in our New York Metro office who specializes in benefit implementation consulting. He helps organizations work by helping organizations to properly administer their benefit plans and to align their benefit strategy with the overall goals of the organization.*

### Delivering results for clients

Saul has assisted a wide range of clients with the implementation of their benefit plans, including Banco Santander, Ford Foundation, Port Authority of NY and NJ, and Jewish Home and Hospital. He has also assisted Hay Group's Reward, Executive, and Total Compensation practices, working with clients such as Novartis, Fortune Magazine, and Valley National Bank.

### Areas of expertise

Saul works on a wide range of employee benefit issues, including pension and retiree health valuations for a variety of clients, in both the public and private sectors. He works on Total Reward analyses, and recommends plan design changes to make client's benefits programs more cost efficient and competitive. For many years Saul has been performing actuarial reviews of Medicare Advantage and Part D Prescription Drug Plans for the Centers for Medicare and Medicaid Services (CMS). He has also performed actuarial audits of Medicare Advantage and Part D plans for CMS, using his in-depth understanding of health care actuarial rate development. Additionally, Saul works on executive and total remuneration benchmarking and analysis.

### Saul's Education and Affiliations

Saul is an Associate in the Society of Actuaries and a member of the American Academy of Actuaries. Saul has a Bachelor of Science in Talmudic Law from Regents College via Mercaz Hatorah University in Jerusalem.

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## Robert Landau, ESQ



### Overview

*Robert Landau is an attorney. He is a Principal in Hay's Benefits Practice Research Group, which provides legal and other technical support to Hay Group consultants and clients in virtually all aspects of Hay's employee benefits and reward practices.*

### Delivering results for clients

Robert's current clients include numerous governmental, not-for-profit, and for-profit organizations including, Metropolitan Washington Airports Authority, Port Authority of New York and New Jersey, United States Postal Service, the Pennsylvania State Employee Retirement System, St. Vincent's Catholic Medical Centers, Norfolk Southern, and Jewish Home Lifecare.

Robert works with a range of clients on all aspects of employee benefits, including retirement plan redesign and compliance, health and welfare plan compliance, nonqualified deferred compensation arrangements, and reasonable remuneration requirements for tax-exempt organizations subject to TBOR2 requirements.

### Areas of expertise

Robert focuses on all aspects of employee benefits, including defined benefit and defined contribution plans, nonqualified deferred compensation arrangements for executives, welfare plans, flexible benefit plans, and other fringe benefit plans. He also monitors and analyzes legislative, regulatory, and judicial developments affecting all types of employee benefit plans and compensation arrangements and prepares client and internal communications on these developments.

### Robert's Education and Affiliations

Before joining the Hay Group, Robert was a partner in the Washington, D.C. law firm of Feder & Semo, where he specialized in employee benefits law. Prior to that, Robert represented the teachers of Montgomery County, Maryland, in contract negotiations and other labor and teacher profession issues. Before becoming an attorney, Robert taught high school English, and was active in curriculum, professional and leadership development. Robert

Landau received his JD, cum laude, from Georgetown University Law Center, an MA in English from Indiana University, and a BA in English from the University of Michigan.

For the past 20 years, Robert has worked with numerous clients with respect to their employee benefit programs. Robert has written numerous articles on current benefit developments and has been a speaker at annual and regional employee benefit conferences.

### **Contact**

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## Erika Mitchell



### Overview

*Erika Mitchell is an Associate in the Benefits Practice in the Washington, D.C. office of Hay Group. Ms. Mitchell is responsible for providing actuarial analysis of employee benefit plans and has over twelve years of experience in the employee benefits field.*

### Delivering results for clients

Throughout her career, Ms. Mitchell has been a key member of the consulting team that has daily responsibility for the Pennsylvania State Employees' Retirement System actuarial services and special projects. She has also participated in actuarial analyses of several Federal pension plans, including the Public Health Service (PHS) and National Oceanic and Atmospheric Administration (NOAA). The actuarial analyses and services performed for these clients include the production of reports required by The CFO Act.

Erika has participated in numerous analyses for the Congressional Research Service to project the premium cost impacts of national health care reform proposals. In conjunction with that work, she has also designed, implemented and tested several modifications to the software platform used for health care premium projections. These software models are designed to provide premium estimates for most types of health care delivery systems in the market place, including Medicare and Medigap.

### Erika's Education and Affiliations

Erika Mitchell's educational background includes a B.S. in Mathematics from George Mason University, with a concentration in Actuarial Science. Erika has successfully completed actuarial examinations sponsored by the Society of Actuaries.

### Contact

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## Jared O. Grove



### Overview

*Jared O. Grove is an Actuarial Associate of Hay Group's Benefits Practice in the Washington, DC office. Mr. Grove has over five years experience as a retirement benefits consultant with expertise in both OPEB and pension plan valuations.*

### Delivering results for clients

Mr. Grove's recent Hay Group experience includes:

- Assisting State of Colorado in the analysis of the rate filings submitted by Insurers in response to the Affordable Care Act
- Assisted State of Alaska with their analysis of the possible consolidation of health plans for Alaska State School District employees.
- Participation in the review for the Center for Medicare and Medicaid Services of the reasonableness of actuarial bids for participation in the Medicare Part D Plan program each year since 2007
- Participation in actuarial audits of Medicare Advantage and Part D Plan actuarial bids on behalf of the Centers for Medicare and Medicaid Services
- Individual Retirement Benefit Calculations for the Archdiocese of Washington, Pennsylvania State Employees Retirement System, and Metropolitan Washington Airports Authority
- Assisted Washington State with their analysis of the possible consolidation of health plans for Washington State School District employees.
- Assisted Michigan Legislature System with their analysis of the possible consolidation of health plans for Michigan School District employees.
- Working on FAS 87 & 106, and GASB 43 & 45 valuations for United States Postal Service, MacArthur Foundation, Metropolitan Washington Airports Authority, Inova Health System, Harris Corporation, Chatham County of Georgia, Commonwealth of Pennsylvania
- Working on pension plan valuations for Metropolitan Washington Airports Authority, City of Rockville, Maryland, Public Health Service, National Oceanic and Atmospheric Administration

### Jared's Education and Affiliations

Prior to joining Hay in September of 2005, Mr. Grove had a half year of experience in healthcare while employed between his junior and senior years of college in the Actuarial Pricing Department of HealthAmerica/ HealthAssurance in Harrisburg, PA, where he gained experience

in various healthcare instruments. Jared O. Grove earned a B.S. in Actuarial Science from Lebanon Valley College.

Mr. Grove has passed three actuarial examinations and is currently working towards attaining designation as an Associate of the Society of Actuaries.

### **Contact**

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## Sanjit Puri



### Overview

*Sanjit Puri is a Consultant in the actuarial consulting practice in the Washington, DC office of the Hay Group. Mr. Puri has over five years experience as a retirement benefits consultant with expertise in the design, funding and accounting of retirement income and retiree health care programs.*

### Delivering results for clients

Sanjit's recent Hay experience includes:

- Worked on FAS 87 & 106, and GASB 43 & 45 valuations for United States Postal Service, MacArthur Foundation, Metropolitan Washington Airports Authority, Inova Health System, Harris Corporation, City of Philadelphia, and City of Dallas, Port Authority of NY & NJ, Public Health Service, NOAA, Coast Guard, Chatham County of Georgia, Commonwealth of PA.
- Participation in the review for the Center for Medicare and Medicaid Services of the reasonableness of 2008 actuarial bids for participation in the 2008 Medicare Part D Plan program.
- Conducted an actuarial audit of 2006, 2007, 2008, and 2009 Medicare Advantage and Part D Plan actuarial bids for Centers for Medicare and Medicaid Services.
- Assisted Michigan Legislature System with their analysis of the possible consolidation of health plans for Michigan School District employees.
- Modeled pharmacy benefits for a national association's self-insured health plan.
- Assisted the Pennsylvania Legislature System with their analysis of the possible consolidation of health plans for PA School District employees. The project used Hay's Benefit Value Comparison programs to analyze the value of the different health plans.
- Assisted a software company in expanding their healthcare modeling capability.
- Developed an actuarial model for the Commonwealth of PA. The model allows the user to input healthcare costs/savings factors, and projects the Post Retirement medical liability into the future.



## **Sanjit's education and affiliations**

Prior to joining Hay in 2003, Sanjit had one year's experience in the financial services field and was employed by Prudential as a financial services associate where he gained experience in various financial and protection instruments.

Sanjit Puri holds a MBA in Finance and Supply Chain Management from Rutgers University and a B.S. from the University of Delhi.

Sanjit is an Associate of the Society of Actuaries and a member of the American Academy of Actuaries. He has also passed levels 1 and 2 of the Chartered Financial Analyst examinations.

## **Contact**

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Tel: 1-703-841-3179

## Kurt Fichthorn



### Overview

*Kurt works with clients from both the public and private sectors to help them insightfully utilize technology in connection with employee benefit and compensation applications.*

### Delivering results for clients

Kurt led the development of software to administer domestic pension plans for a leading airline, including a web-based employee self-service pension estimator.

As the Technology consultant to a major government agency, he assisted in implementing a full flex cafeteria plan.

His role in implementing web-based Total Reward Statements designed to provide employees with personalized compensation and benefits information in an interactive environment has helped organizations realize a greater return on their Total Reward investment.

Kurt led the programming and technical effort to create Hay's FAS 123(R) compliant binomial Stock Option valuation software which allows companies to report share-based compensation expense.

### Areas of expertise

Kurt has worked in the Employee Benefits and Executive Compensation areas of Hay's Reward practice for most of his career.

### Kurt's Education and Affiliations

A Fellow of the Society of Actuaries, an Enrolled Actuary under ERISA, and a Member of the American Academy of Actuaries, Kurt has spoken before numerous professional bodies.

Kurt holds a Bachelor of Science degree from Butler University, Indianapolis, Indiana. Graduate studies in mathematics at Butler and in statistics at the University of Connecticut, Storrs, Connecticut, preceded his joining the Hartford Insurance Group as an actuarial student in 1977. Kurt has been with Hay Group since 1979.

### Contact

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## Greg Schoener



### Overview

*As a systems analyst and an actuarial analyst, Greg Schoener assists employers by creating accurate pension and other benefit calculators. He studies his clients' plan descriptions to determine the exact rules and formulas, and then develops computer programming to produce consistent and accurate benefit calculations.*

### Delivering results for clients

Since joining Hay Group in 1993, Greg has developed benefit-related software including Total Rewards web sites and Hay Group's proprietary PVL (Pension Valuation Language) and PCL (Pension Calculation Language) applications. His clients have included United Air Lines, Avaya Inc., Mars Inc., Air Products & Chemicals, and Hess Corporation.

### Areas of expertise

Greg brings his in-depth understanding of actuarial issues and years of experience in computer programming to successfully translate plan descriptions into efficient computer applications. Clients are consistently impressed with Greg's quick understanding of their issues, meticulous attention to detail and accuracy, and his dedication to the satisfaction of their needs.

With his combination of actuarial expertise, computer programming and systems skills, and client interaction, Greg is particularly well-suited to delivering accurate and effective solutions.

### Greg's Education and Affiliations

Greg completed his Bachelor of Science in Mathematics from St. Joseph University in Philadelphia, PA and is a Fellow of the Society of Actuaries.

### Contact

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## David Reichert



### Overview

*David Reichert is a Consultant of the Benefits Practice in the Philadelphia office. He has been with Hay Group since 2001 and has 14 years of experience in the administration and valuation of defined benefit plans and related services including FASB 87 and FASB 88 accounting requirements, plan terminations, early retirement incentive plans, GASB 25, GASB 27, GASB 43 and GASB 45 accounting requirements.*

### Delivering results for clients

David Reichert's responsibilities include daily consulting associated with administration and valuation of pension plans for over fifty counties in Pennsylvania. He, also, consults on other postretirement employment benefit plans for the counties of Pennsylvania.

David Reichert's work includes providing annual valuation reports to the retirement board of the counties of Pennsylvania, providing estimated and final individual benefit calculations to which county employees are entitled, providing annual individual benefit statements to county employees, and speaking to county employees about the county provided defined benefit plan.

### Areas of expertise

David Reichert is part of a four-person team that works exclusively on the Pennsylvania County retirement plans. They have over 50 years of combined experience working with these plans. This team-work has been delivering results to the counties of Pennsylvania for more than 60 years.

### David's Education and Affiliations

Prior to joining the Hay Group in 2001, David Reichert worked for Milliman & Robertson from 1999 to 2001 and for Sedgwick Noble Lowndes from 1995 to 1999 as well as the Hay Group from 1992 to 1995 where he gained defined benefit pension experience on a wide variety of clients.

David Reichert is an Enrolled Actuary under ERISA and a member of the American Academy of Actuaries. In addition, he has numerous credits towards his Associateship in the Society of Actuaries. He holds a Bachelor of Science degree in Mathematics from Grove City College.

### Contact

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## Myriam Michaels



### Overview

*Myriam Michaels has over fifteen years of experience in human resources consulting. Ms. Michaels provides consulting services to public and private sector organizations, including performance management, compensation and benefits studies, survey research, classification audits, customized market surveys, and complex analytical studies. She has consulted in the area of market research, job evaluation, and manipulation and analysis of compensation data.*

### Delivering results for clients

Myriam has considerable experience assisting clients in the area of job evaluation, job classification and compensation design. Ms Michaels has also helped many clients successfully complete organizational improvement initiatives related to performance management, compensation, and classification. The work performed for clients has involved meeting with HR staff or executives of organizations to determine pay philosophy, culture, and goals and strategy; performing cultural assessments involving other levels of employees; conducting surveys of competitors to identify market trends and practices; and designing solutions for performance management and pay systems that are aligned with the clients' philosophy, culture and strategic goals.

### Relevant Experience

Myriam conducts studies for a large number of not-for-profit organizations in the Metro DC area including Society for Human Resources Management (SHRM), Maryland & Virginia Milk Producers Association, Airline Pilots Association, and the National Cancer Institute. Following are a few examples:

**International Monetary Fund, The World Bank.** For the past eleven years, Myriam has guided an annual project that provided a report on international compensation to the World Bank and International Monetary Fund. Myriam conducted regular status meetings; coordinated and managed the efforts of consultants in three different countries; developed and analyzed a custom compensation survey (including feedback reports to participants; a onetime benchmarking study on the impact of office technology; meetings with survey participants from both the federal government and the private sector) and developed draft and final reports for the client.

**Inter-American Development Bank.** For the past eight years, Myriam has assisted the IADB with international compensation review to include work measurement, compensation analysis and benefits review. Her most recent assignment included a study on behalf of a

special committee of the Board of Governors to review pay for Executive Directors to the IDB Board of Governors.

**American Association of Blood Banks.** Myriam has worked for many years with AABB in strategically developing appropriate compensation systems for staff and senior executives in the organization. Her relationship includes the development of a new pay structure for all staff and recommendations for total remuneration for executive level Directors and the CEO for review and approval by the working Board of Directors.

**American Physiological Society.** As a compensation consultant, Myriam is currently assisting APS in the review and redesign of the current total remuneration system to better meet the competitive needs of APS in the recruitment, retention and motivation of management, professional, technical, administrative and support positions. The program must be internally equitable, effective, competitive and reasonable in the context of APS organization strategies, management and compensation philosophies, and current and future operating environments, recognizing the complex environment of a fully focused technical journal publication organization. In achieving these objectives she will assist APS in formalizing a total remuneration philosophy that forms the foundation of APS compensation and benefits programs, and determines reward directions and strategies. This philosophy will aid in the development of competitive base salary, and annual and long term incentives and benefits programs as appropriate. Myriam will assess the competitiveness of the recommended total remuneration program among similar kinds of organizations, for similar work roles in the Washington Metropolitan area and nationally.

**AOAC International.** Myriam has recently completed an audit of the current job evaluation system for AOAC International and has assisted in the development of a compensation structure based on market factors and budgetary considerations for AOAC. Myriam has an ongoing relationship with internal Human Resources in developing strategies for employee negotiations, providing materials and information as needed.

## **Myriam's Education and Affiliations**

Myriam Michaels received her Bachelor of Arts degree in Spanish and attended the University of Maryland. Ms. Michaels is fluent in Spanish. Myriam is a member of WorldatWork. (Formerly American Compensation Association) and the Society for Human Resource Management

## **Contact**

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## Connie Schroyer, Ph.D



### Overview

*Connie J. Schroyer, Ph.D. is a Vice President at Hay Group. She has over 25 years experience in helping organizations implement their strategy through executive team facilitation, leadership development/coaching, executive assessment, succession planning, talent management, organizational culture change, and design of competency-based human resource development programs. Her work has resulted in helping organizations to gain clarity among their executives around how they can better meet their organization's strategic goals.*

### Delivering results for clients

Since joining Hay Group over twenty years ago, Dr. Schroyer has worked with numerous private and public sector clients at the senior executive level. She has provided leadership development, succession planning, assessment and executive coaching to help leaders at all levels improve their business results. Her clients include Astra Zeneca, Kaiser Permanente, Panasonic, Pfizer, Kraft Foods, Quintiles, World Bank, Verizon, BAE Systems, T. Rowe Price, Intelsat, SRA International, SAIC, FDIC, FAA, IRS, US Postal Service, and Department of Defense.

Dr. Schroyer works with clients to help them improve their top team effectiveness, selection processes, and succession planning through executive assessments and assessment centers. She is responsible for the assessment and on-boarding of executive hires at major companies and also runs assessment centers to help companies in their succession planning efforts.

### Areas of expertise

Dr. Schroyer is a frequent speaker on topics such as leadership effectiveness, organizational culture, Emotional Intelligence, and competency-based human resources systems. She is also an experienced facilitator who has led groups ranging from 5 to 500 on topics such as consensus building, culture change, and Emotional Intelligence. Dr. Schroyer's executive assessment and coaching experience includes:

- Numerous coaching and on-boarding of executives at major organizations including Kraft Foods, Kaiser Permanente, Intelsat, BAE Systems, T. Rowe Price, AOL, US Postal Service, and Federal Aviation Administration..
- Developed a coaching program for United States Postal Service and coached executives going through a leadership program for high potentials. Included on-boarding of new Officer into new vice president role.
- Coached and provided on-boarding assistance to a new president for a subsidiary of a satellite company. The new president now heads the highest growth area of the business.



- Coached a senior executive at a high tech company to help with the transition to a new role on the executive team. Developed a role profile for the new role and provided an assessment of areas of strength and key risk areas.

Prior to joining Hay Group in 1991, Dr. Schroyer was a Senior Scientist and Project Manager for a non-profit human resources research organization, HumRRO, where she conducted research on leader effectiveness, large scale survey research, program evaluations, and organizational assessments.

### **Connie's Education and Affiliations**

Ph.D., Industrial/Organizational Psychology, George Washington University  
M.Phil., Industrial/Organizational Psychology, George Washington University  
B.S., Psychology (with Honors), University of Maryland  
Member, American Psychological Association (APA)  
Member, Society for Industrial and Organizational Psychologists (SIOP)  
Board Member, Secretary, Society of Psychologists in Management (SPIM)  
Advisory Board, Johns Hopkins University, MBA/OD Program  
Editorial Board 2003- 2005, Consulting Psychology Journal

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## VI. Training

Over prior contract periods, Hay Group has provided a variety of training sessions for SERS staff on both a group and individual basis. These include:

- Domestic Relations Order training for SERS counselors
- ‘Actuarial Science 101’ instruction for SERS staff at Hay Group
- Post-Age 70 Actuarial Increase calculations
- Supplemental Death Benefit calculations

Hay Group is happy to continue to assist SERS staff with their training needs over the upcoming contract period. A need that Hay Group sees is the training of staff attorneys in the actuarial nuances of the SERC. Currently SERS has one staff attorney who has an amazing grasp on the actuarial implications of changing provisions of the SERC. We believe SERS would be well served to have more attorneys trained in actuarial calculations so that they can more readily step in when legislative bills or amendments are requested.

Hay Group will work with SERS staff to identify specific training needs and propose topics, materials, timeframe, and location for any such training.



## VII. Financial Capability

Hay Group's financial stability and economic capability to perform the contract requirements has been, over past years, and will remain, very strong. We have provided Hay Group's financial statements for the past three fiscal years on the pages that follow.



KPMG LLP  
1601 Market Street  
Philadelphia, PA 19103-2499

## Independent Auditors' Report on Supplementary Information

The Board of Directors and Shareholders  
HG (Luxembourg) S.a.r.l.:

We have audited the consolidated financial statements of HG (Luxembourg) S.a.r.l. and its subsidiaries as of and for the year ended September 30, 2014 and 2013, and have issued our report thereon dated February 16, 2015 which contained an unmodified opinion on those consolidated financial statements. Our audit was performed for the purpose of forming an opinion on the consolidated financial statements as a whole. The Consolidating Financial Information is presented for the purposes of additional analysis and is not a required part of the consolidated financial statements. Such information is the responsibility of management and was derived from and relates directly to the underlying accounting and other records used to prepare the consolidated financial statements. The information has been subjected to the auditing procedures applied in the audit of the consolidated financial statements and certain additional procedures, including comparing and reconciling such information directly to the underlying accounting and other records used to prepare the consolidated financial statements or to the consolidated financial statements themselves, and other additional procedures in accordance with auditing standards generally accepted in the United States of America and International Standards on Auditing. In our opinion, the information is fairly stated in all material respects in relation to the consolidated financial statements as a whole.

KPMG LLP

Philadelphia, Pennsylvania  
February 16, 2015

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## Consolidating statement of comprehensive income

for the year ended September 30, 2014

	Hay Group US \$'000
<b>Continuing operations</b>	
Revenues	89,620
Royalties	12,171
Corporate management fees	23,268
<b>Total revenues</b>	<b>125,059</b>
Cost of revenues from third parties	(51,581)
Cost of revenues from management fees	(15,632)
<b>Gross profit</b>	<b>57,846</b>
General administrative expenses	(48,013)
<b>Profit from operations</b>	<b>9,833</b>
Finance income	60
Finance costs	(856)
<b>Profit before taxation</b>	<b>9,037</b>
Tax expense	(4,061)
<b>Profit for the year</b>	<b>4,976</b>
<b>Other comprehensive income:</b>	
<b>Items that will not be reclassified to profit or loss:</b>	
Actuarial loss relating to retirement benefit obligations	(4,846)
Deferred tax attributable to actuarial gain / loss	1,973
<b>Items that may be reclassified to profit or loss:</b>	
Exchange adjustments on foreign currency net investments	10
Other unrealized gains	12
<b>Other comprehensive income / (loss) for the year, net of tax</b>	<b>(2,851)</b>
<b>Total comprehensive income for the year</b>	<b>2,125</b>

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## Consolidating statement of financial position

as of September 30, 2014

	Hay Group US \$'000
<b>Non current assets:</b>	
Goodwill	-
Intangible assets	6,270
Property and equipment	1,867
Deferred tax assets	21,401
Other debtors and investments in affiliates	391
<b>Total non current assets</b>	<b>29,929</b>
<b>Current assets:</b>	
Trade and other receivables - external	21,209
Trade and other receivables - affiliates	101,721
Cash and cash equivalents	2,858
Prepayments and other debtors	4,307
<b>Total current assets</b>	<b>130,095</b>
<b>Total assets</b>	<b>160,024</b>
<b>Current liabilities</b>	
Finance leases	-
Trade and other payables - external	8,292
Trade and other payables - affiliates	31,743
Accrued compensation	12,685
Deferred income	11,895
Due to parent entity	-
Deferred consideration	-
Current tax liabilities	102
<b>Total current liabilities</b>	<b>64,717</b>
<b>Net current assets / (liabilities)</b>	<b>65,378</b>
<b>Non current liabilities</b>	
Finance leases	-
Retirement benefit obligation	22,686
Non current tax liabilities	-
Deferred tax liabilities	601
Accrued compensation	6,718
Due to related party	-
Long term provision	18,709
<b>Total non current liabilities</b>	<b>48,714</b>
<b>Total liabilities</b>	<b>113,431</b>
<b>Net assets / (liabilities)</b>	<b>46,593</b>
<b>Equity</b>	
Share capital	8,000
Cumulative translation reserve	1
Retained earnings / (deficit)	38,592
<b>Total equity shareholders' funds / (deficit)</b>	<b>46,593</b>

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KPMG LLP  
1601 Market Street  
Philadelphia, PA 19103-2499

## Independent Auditors' Report on Supplementary Information

The Board of Directors and Shareholders  
Hay Group Investment Holdings B.V.:

We have audited the consolidated financial statements of Hay Group Investment Holdings B.V. and its subsidiaries as of and for the year ended September 30, 2013 and 2012, and have issued our report thereon dated February 21, 2014, which contained an unmodified opinion on those consolidated financial statements. Our audit was performed for the purpose of forming an opinion on the consolidated financial statements as a whole. The Consolidating Financial Information is presented for the purposes of additional analysis and is not a required part of the consolidated financial statements. Such information is the responsibility of management and was derived from and relates directly to the underlying accounting and other records used to prepare the consolidated financial statements. The information has been subjected to the auditing procedures applied in the audit of the consolidated financial statements and certain additional procedures, including comparing and reconciling such information directly to the underlying accounting and other records used to prepare the consolidated financial statements or to the consolidated financial statements themselves, and other additional procedures in accordance with auditing standards generally accepted in the United States of America and International Standards on Auditing. In our opinion, the information is fairly stated in all material respects in relation to the consolidated financial statements as a whole.

**KPMG LLP**

Philadelphia, Pennsylvania  
February 21, 2014

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## Consolidating statement of comprehensive income

for the year ended September 30, 2013

	Hay Group US \$'000
<b>Continuing operations</b>	
Revenues	87,665
Royalties	6,890
Corporate management fees	22,835
<b>Total revenues</b>	<b>117,390</b>
Cost of revenues from third parties	(61,052)
Cost of revenues from management fees	(14,016)
<b>Gross profit</b>	<b>42,322</b>
General administrative expenses	(40,844)
<b>Profit from operations</b>	<b>1,478</b>
Finance income	100
Finance costs	(917)
<b>Profit before taxation</b>	<b>661</b>
Tax expense	1,713
<b>Profit for the year</b>	<b>2,374</b>
<b>Other comprehensive income:</b>	
<b>Items that will not be reclassified to profit or loss:</b>	
Actuarial gain relating to retirement benefit obligations	6,996
Deferred tax attributable to actuarial gain / loss	(2,817)
<b>Items that may be reclassified to profit or loss:</b>	
Exchange adjustments on foreign currency net investments	-
Other unrealized gains	148
<b>Other comprehensive income / (loss) for the year, net of tax</b>	<b>4,327</b>
<b>Total comprehensive income for the year</b>	<b>6,701</b>

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## Consolidating statement of financial position

as of September 30, 2013

	Hay Group US \$'000
<b>Non current assets:</b>	
Goodwill	-
Intangible assets	2,442
Property and equipment	2,007
Deferred tax assets	18,751
Other debtors	391
<b>Total non current assets</b>	<b>23,591</b>
<b>Current assets:</b>	
Trade and other receivables - external	19,654
Trade and other receivables - affiliates	96,479
Cash and cash equivalents	2,036
Prepayments and other debtors	3,210
<b>Total current assets</b>	<b>121,379</b>
<b>Total assets</b>	<b>144,970</b>
<b>Current liabilities</b>	
Finance leases	-
Trade and other payables - external	7,285
Trade and other payables - affiliates	25,460
Accrued compensation	12,534
Deferred income	11,515
Current tax liabilities	3,122
<b>Total current liabilities</b>	<b>59,916</b>
<b>Net current assets / (liabilities)</b>	<b>61,463</b>
<b>Non current liabilities</b>	
Finance leases	-
Retirement benefit obligation	17,641
Non current tax liabilities	-
Deferred tax liabilities	103
Accrued compensation	6,391
Long term provision	16,451
<b>Total non current liabilities</b>	<b>40,586</b>
<b>Total liabilities</b>	<b>100,502</b>
<b>Net assets / (liabilities)</b>	<b>44,468</b>
<b>Equity</b>	
Share capital	8,000
Cumulative translation reserve	-
Retained earnings / (deficit)	36,468
<b>Total equity shareholders' funds / (deficit)</b>	<b>44,468</b>

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KPMG LLP  
1601 Market Street  
Philadelphia, PA 19103-2499

## Independent Auditors' Report on Supplementary Information

The Board of Directors and Shareholders  
Hay Group Investment Holdings B.V.:

We have audited the consolidated financial statements of Hay Group Investment Holdings B.V. and its subsidiaries as of and for the year ended September 30, 2012, and have issued our report thereon dated February 28, 2013 which contained an unmodified opinion on those consolidated financial statements. Our audit was performed for the purpose of forming an opinion on the consolidated financial statements as a whole. The Consolidating Financial Information is presented for the purposes of additional analysis and is not a required part of the consolidated financial statements. Such information is the responsibility of management and was derived from and relates directly to the underlying accounting and other records used to prepare the consolidated financial statements. The information has been subjected to the auditing procedures applied in the audit of the consolidated financial statements and certain additional procedures, including comparing and reconciling such information directly to the underlying accounting and other records used to prepare the consolidated financial statements or to the consolidated financial statements themselves, and other additional procedures in accordance with auditing standards generally accepted in the United States of America and International Standards on Auditing. In our opinion, the information is fairly stated in all material respects in relation to the consolidated financial statements as a whole.

**KPMG LLP**

Philadelphia, Pennsylvania  
February 28, 2013

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## Consolidating statement of comprehensive income

for the year ended September 30, 2012

	Hay Group US \$'000
<hr/>	
Continuing operations	
Revenues	94,870
Royalties	12,838
Corporate management fees	25,120
Total revenues	132,828
Cost of revenues from third parties	(57,831)
Cost of revenues from management fees	(12,494)
Gross profit	62,503
General administrative expenses	(43,931)
Profit from operations	18,572
Finance income	1,303
Finance costs	(647)
Profit before taxation	19,228
Tax expense	(5,870)
Profit for the year	13,358
<hr/>	
Other comprehensive income:	
Exchange adjustments on foreign currency net investments	-
Actuarial loss relating to retirement benefit obligations	(2,582)
Deferred tax attributable to actuarial loss	969
Other unrealized gains	16
Other comprehensive income / (loss) for the year, net of tax	(1,597)
Total comprehensive income for the year	11,761

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## Consolidated statement of financial position

as of September 30, 2012

	Hay Group US
	\$'000
Non current assets:	
Goodwill	-
Intangible assets	1,537
Property and equipment	2,499
Deferred tax assets	14,599
Other debtors	392
<b>Total non current assets</b>	<b>19,027</b>
Current assets:	
Trade and other receivables - external	20,593
Trade and other receivables - affiliates	88,352
Cash and cash equivalents	4,404
Prepayments and other debtors	1,839
<b>Total current assets</b>	<b>115,188</b>
<b>Total assets</b>	<b>134,215</b>
Current liabilities	
Finance leases	-
Trade and other payables - external	7,266
Trade and other payables - affiliates	21,074
Accrued compensation	16,578
Deferred income	11,008
Current tax liabilities	2,492
<b>Total current liabilities</b>	<b>58,418</b>
<b>Net current assets</b>	<b>56,770</b>
Non current liabilities	
Finance leases	-
Retirement benefit obligation	25,638
Non current tax liabilities	-
Deferred tax liabilities	209
Accrued compensation	6,079
Long term provision	6,103
<b>Total non current liabilities</b>	<b>38,029</b>
<b>Total liabilities</b>	<b>96,447</b>
<b>Net assets / (liabilities)</b>	<b>37,768</b>
Equity	
Share capital	8,000
Cumulative translation reserve	-
Retained earnings / (deficit)	29,768
<b>Total equity shareholders' funds / (deficit)</b>	<b>37,768</b>

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## VIII. Objections and Additions to Contract Terms and Conditions

In the event the Commonwealth of Pennsylvania State Employees' Retirement System ("SERS") awards the contract to Hay Group pursuant to Request for Proposals (RFP 2016-15) for Actuarial Services and Pension Plan Consulting, Hay Group agrees to enter into an agreement with the Authority in a substantive form as that in Part V – Contract Terms and Conditions, and Appendix F as set forth in the RFP.

Pursuant to Part II-8, Objections and Additions to Contract Terms and Conditions, of the RFP, Hay Group would like to negotiate or add the following terms and conditions set forth in Part V and Appendix F of the RFP:

1. Appendix F.
  - I. Section 5, Representations of ACTUARY, part (a), Fiduciary Status. This Section indicates that the Actuary acknowledges that it is a "fiduciary" with respect to SERS and the Fund as such term is defined in ERISA § 3(21)(A). We request that the Commonwealth delete Section 5(a) because there are no facts or circumstances when the Actuary would exercise discretionary authority or responsibility, and it is simply unheard of to have an actuary, in the performance of actuarial duties, serve as a fiduciary with respect to that plan. Please see U.S. Department of Labor Interpretive Bulletin § 2509.75-5, D-1 (actuary performing usual professional functions will ordinarily not be a fiduciary).
  - II. Section 6, ACTUARY'S Insurance. Presently, Hay Group's errors and omissions insurance limit is \$2,000,000. Excess liability will be covered by Hay Group's Commercial General Liability limit of \$5,000,000, and Umbrella coverage of \$5,000,000.
  - III. Section 7, Certification of Taxpayer Identification Number. Please note Hay Group's EIN is [REDACTED].
  - IV. Section 8, Change in ACTUARY's Status. Please note that Hay Group is wholly owned by Korn Ferry. Korn Ferry is a publicly traded company. As such, Hay Group may not be able to provide all information requested in this provision. To the extent



permitted by law, Hay Group will comply with the requirements set forth in this paragraph.

V. Section 10, Indemnification of SERS. In lieu of this paragraph, Hay Group requests use of Part V, V.23 CONTRACT – 019.2 Hold Harmless Provision (Nov 30, 2006).

VI. Hay Group requests the addition of the following language:

- (a) Limitation of Liability. Except for a judicial determination of fraud or willful misconduct, under no circumstances shall either party be liable to the other party, its agents, successors or assigns, for any lost revenue, lost profits, or any incidental, indirect, punitive, or consequential damages or any damages of any kind (including attorneys' fees) in excess of the aggregate amount actually paid to ACTUARY under this Agreement, even if that party has been advised of the possibility of such damages, regardless of the theory of recovery. Some states do not allow certain limitations of liability, so the foregoing may not apply. In such states, liability is limited to the fullest extent permitted by law.
- (b) No action, regardless of form, arising out of or in connection with this Agreement, may be brought by either party more than two (2) years after the cause of such action has arisen. This limitation will apply, regardless of the form of action, whether in contract, in tort, including negligence, or otherwise.
- (c) The foregoing subparagraphs (a) and (b) are separable, essential provisions of this Agreement, and shall be effective even if any remedy shall be deemed to fail of its essential purpose.





## IX. Emergency Preparedness

Introduction: Sec. IV-2. E. of RFP Number SERS 2015-028 requested information from Offerors regarding Emergency Preparedness. The questions/requests that were made are included below, along with Hay Group's responses ("Hay Group:").

To support continuity of operations during an emergency, including a pandemic, the Commonwealth needs a strategy for maintaining operations for an extended period of time. One part of this strategy is to ensure that essential contracts that provide critical business services to the Commonwealth have planned for such an emergency and put contingencies in place to provide needed goods and services.

1. Describe how you anticipate such a crisis will impact your operations.

Hay Group: Hay Group recognizes that many emergency types can and will disrupt operations and therefore has a business continuity and communication plan in place. All employees have the capability to work remotely and have access to necessary files via Hay Group VPN (Secure Virtual Private Network).

2. Describe your emergency response continuity of operations plan. Please attach a copy of your plan, or at a minimum, summarize how your plan addresses the following aspects of pandemic preparedness:

- a) Employee training (describe your organization's training plan, and how frequently your plan will be shared with employees).

Hay Group: Employees in each office are aware of the local point person who will assess the emergency situation and communicate during emergency situations. The plan is updated and communicated at least once annually.

- b) Identified essential business functions and key employees (within your organization) necessary to carry them out.

Hay Group: Each office has designated an emergency preparedness point person, backup, and site survey person who is most logical to visit the site as necessary during an



emergency. The local field staff are in contact with headquarters staff to formulate and communicate the emergency plan.

c) Contingency plans for:

- i.) How your organization will handle staffing issues when a portion of key employees are incapacitated due to illness.

Hay Group: If a portion of staff are unable to work due to an emergency, alternate staff in other locations can be called upon, via a national network, to perform the work and ensure client obligations are delivered.

- ii.) How employees in your organization will carry out the essential functions if contagion control measures prevent them from coming to the primary workplace.

Hay Group: In the event a certain location is unavailable due to an emergency, work can be (a) routed to employees in another location or (b) conducted by local employees working remotely (e.g. from home or other location of employees choice (Starbucks, Library, etc.)). Employees can be sent to another field office location that is available or Hay Group may rent temporary space for employees to work.

- d) How your organization will communicate with staff and suppliers when primary communications systems are overloaded or otherwise fail, including key contacts, chain of communications (including suppliers), etc.

Hay Group: Hay Group utilizes several communication methods including email, website, social media, SMS text messages and voice communications. Hay Group starts the communication process with impacted employees, senior management, and all US (or global) employees depending on the situation. Clients are notified by account managers or project managers on an as needed basis.

- e) How and when your emergency plan will be tested, and if the plan will be tested by a third-party.



Hay Group: Hay Group's emergency preparedness plan is reviewed annually. Most recently, we did extensive testing of the emergency plan during the Papal visit to Philadelphia during our office closure. Testing included email, voice message and roll call (employee check in) communications as well as updates on the Hay Group Intranet. All Headquarters-based employees were required to test their ability to work remotely in the event of an extended office closure and an alternate work location was secured in the event of an emergency.



## Appendix: Hay Group Reports/Actuarial Work Products

In further support of the value and quality of the services we have consistently brought to SERS, we include in this section the following samples of our work products for SERS:

- 2014 Actuarial Report
- 2014 Benefits Completion Plan Report
- Report on 17th Investigation of Actuarial Experience: 2006 through 2010
- March 2015 Board Presentation – Review of Investment Return Assumption to be Used for December 31, 2014 Actuarial Valuation
- Results of December 2015 Hay Group Review & Analysis of Senate Bill No. 1082 and Variations Thereon, including:
  - Actuarial Cost Note,
  - Cost Projections,
  - Summary Tables,
  - Related Explanatory Materials



## 2014 Actuarial Report



# Commonwealth of Pennsylvania State Employees' Retirement System

2014 Actuarial Report



**COMMONWEALTH OF PENNSYLVANIA**

**STATE EMPLOYEES' RETIREMENT SYSTEM**

**2014 ACTUARIAL REPORT**

**DEFINED BENEFIT PLAN**

**HAY GROUP, INC.**

**JUNE 10, 2015**



June 10, 2015

Mr. David E. Durbin  
Executive Director  
State Employees' Retirement System  
30 North Third Street  
Suite 150  
Harrisburg, PA 17101-1716

Hay Group, Inc.  
Suite 600  
4301 North Fairfax Drive  
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USA

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fax +1.703.841.3108

[www.haygroup.com](http://www.haygroup.com)

Dear Mr. Durbin:

The purpose of this letter is to certify the actuarial adequacy of the contributions being made by the Commonwealth of Pennsylvania and other participating agencies to the Pennsylvania State Employees' Retirement System (SERS), and to discuss the approach currently being taken toward meeting the financing objectives of the plan. The results provided herein are based upon the December 31, 2014 annual actuarial valuation.

The funding objective of the plan is set forth in the State Employees' Retirement Code (SERC). The annual employer contribution is equal to the sum of the following for the fiscal year beginning July 1, 2015:

- (1) The employer share of the normal cost.
- (2) The fresh start amortization of the December 31, 2009 unfunded liability over a 30-year period beginning July 1, 2010 and ending on June 30, 2040.
- (3) The amortization of the change in liability due to Act 2010-120 over a 30-year period beginning July 1, 2011 and ending on June 30, 2041.
- (4) The amortization of changes in liability due to actual experience differing from assumed experience after December 31, 2009 over 30-year periods beginning with the July first following the actuarial valuation determining such changes.
- (5) The amortization of legislated benefit changes, including cost-of-living increases, over 10-year periods beginning with the July first following the actuarial valuation determining such changes. (Note: There are currently no 10-year amortizations being funded.)

The amortization payments are level dollar amounts over the remaining applicable amortization periods. The employer cost is determined as a percent of retirement covered compensation. The total employer cost is the average contribution amount that needs to be received from the employer groups participating in the system. Some employer groups contribute a higher percent of compensation, and some employer groups contribute a lower percent of compensation depending on the benefits payable to their employees.

The actuarial valuation is based on financial and participant data, which is prepared by SERS staff. The data are reviewed for internal and year-to-year consistency as well as general reasonableness prior to their use in the actuarial valuation.

Mr. David E. Durbin  
June 10, 2015  
Page 2

The actuarial valuation uses assumptions regarding future rates of investment return and rates of retirement, withdrawal, death, and disability among SERS members and their beneficiaries. The current set of assumptions used in the December 31, 2014 actuarial valuation, with the exception of the investment return assumption, was adopted by the State Employees' Retirement Board (the Board) based upon actual experience of SERS during the years 2006 through 2010. Based upon subsequent review of SERS investment data and results, the Board approved a reduction in the assumed annual investment return from 8.0% to 7.5% effective as of the December 31, 2011 actuarial valuation and the 7.5% assumption has remained in effect since then. We will continue to closely monitor this assumption and will recommend changing it if conditions warrant such change. The actuarial value of assets is developed by recognizing the difference between the expected actuarial value of assets and the market value of assets over a five-year period.

Apart from the statutory funding requirements set forth in the SERC, there are also separate accounting standards that SERS uses for financial reporting purposes. Governmental Accounting Standards Board (GASB) Statement No. 67, *Financial Reporting for Pension Plans*, replaced the requirements of GASB Statement No. 25, *Financial Reporting for Defined Benefit Pension Plans and Note Disclosures for Defined Contribution Plans*, effective for financial statements for the fiscal year ended June 30, 2014. GASB Statement No. 68, *Accounting and Financial Reporting for Pensions*, which establishes standards for accounting and financial reporting by state and local governments for pensions, will replace the requirements of GASB Statement No. 27, *Accounting for Pensions by State and Local Governmental Employers*, effective for fiscal years ending on or after June 30, 2015. The new reporting requirements of Statements No. 67 and 68 will be provided to SERS under a separate report to provide required financial reporting data to SERS and participating employers of the system.

Based upon the valuation results, it is our opinion that, provided future employer contributions are made in accordance with current law, the Pennsylvania State Employees' Retirement System is in sound condition in accordance with generally accepted actuarial principles and procedures. It should be noted that, with the passage of Act 2010-120 (Act 120), significant changes were legislated to many key benefit provisions of SERS. This was in response to the significant funding challenges SERS had been facing, and will continue to face in coming years. By reducing pensions for future Commonwealth employees and providing funding relief to SERS employers through the use of contribution collars, Act 120 addressed both SERS' long-term and short-term funding challenges.

Mr. David E. Durbin  
June 10, 2015  
Page 3

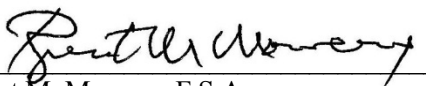
As actuaries for SERS, Hay Group considers it important to note that the establishment of contribution collars results in employer funding for FY2015 and FY2016 (and likely FY2017) at levels below the otherwise applicable pre-collared contribution levels. This is not to say that required employer contributions will never be made; rather, Act 120 provides that they will be deferred and paid in future years. It is therefore essential to the long-term funding of the system that the Commonwealth adhere not only to the short-term collars provided by Act 120 but also to the long-term funding obligations that the statute established. We expect that the contribution collars will govern employer contribution levels for the next actuarial valuation, and the collars will continue to apply until such time as the pre-collared contribution level is below the collared contribution level. While Hay Group would prefer that SERS funding be based upon the pre-collared contribution levels, we recognize, given the extraordinary funding challenges the Commonwealth of Pennsylvania is facing over coming years, that the contribution collars represent an important and necessary funding deferral mechanism for a temporary period, after which funding on an actuarial basis will resume.

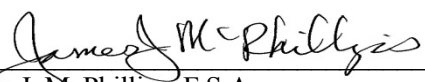
#### Actuarial Certification

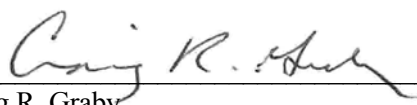
To the best of our knowledge, this report is complete and accurate and all costs and liabilities have been determined in conformance with generally accepted actuarial principles and on the basis of actuarial assumptions and methods which are reasonable (taking into account the past experience of SERS and reasonable expectations) and which represent our best estimate of anticipated experience under the plan.

The actuaries certifying to this valuation are members of the Society of Actuaries or other professional actuarial organizations, and meet the General Qualification Standards of the American Academy of Actuaries for purposes of issuing Statements of Actuarial Opinion.

Respectfully submitted,  
Hay Group, Inc.

By   
Brent M. Mowery, F.S.A.  
Member American Academy of Actuaries  
Enrolled Actuary No. 14-3885

By   
James J. McPhillips, F.S.A.  
Member American Academy of Actuaries  
Enrolled Actuary No. 14-4992

By   
Craig R. Graby  
Member American Academy of Actuaries  
Enrolled Actuary No. 14-7319

# State Employees' Retirement System

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**State Employees' Retirement System**  
**Valuation Highlights**

	<b><u>December 31, 2014</u></b>	<b><u>December 31, 2013</u></b>
	<b><u>Valuation</u></b>	<b><u>Valuation</u></b>
<b>Summary of Employer Contributions as a Percent of Total Compensation</b>		
SERS Plan Contribution		
Normal Cost	4.95%	5.00%
Amortization of Liabilities	26.56%	26.41%
Contribution Before Change Prescribed by Law	31.51%	31.41%
Total SERS Plan Contribution*	25.00%	20.50%
Benefits Completion Plan Contribution	0.01%	0.03%
Total Contribution	25.01%	20.53%

\* Reflects Rates Prescribed by Act 2010-120

**Demographic Characteristics of the Population**

Active Participants:

Number	104,431		105,186
Average age	46.6		46.8
Average service	11.8		12.0
Average annualized compensation	\$ 54,769	\$	53,224
Total annualized compensation	\$ 5,719,581,000	\$	5,598,420,000
Funding payroll	\$ 6,021,688,000	\$	5,897,627,000

Annuitants and Beneficiaries:

Number	122,249		120,052
Average age	68.9		68.7
Total annual pension	\$ 2,552,267,698	\$	2,454,643,846

Inactive and Vested Participants:

Number	7,054		6,395
--------	-------	--	-------

**Assets**

Market Value of Assets	\$ 27,332,909,054	\$	27,390,244,756
Actuarial Value of Assets	\$ 26,584,948,430	\$	25,975,185,060
Funded Status (Market Assets)	61.1%		62.4%
Funded Status (Actuarial Assets)	59.4%		59.2%

## State Employees' Retirement System

### Employer Contribution Rate by Group Fiscal Year 2015 - 2016

	<u>SERS Plan</u>	<u>Benefits Completion Plan</u>	<u>Total</u>
Class A-3 and A-4 Members:			
Age 65 Retirement	17.17%	0.01%	17.18%
Age 55 Retirement	19.81%	0.01%	19.82%
Park Rangers	19.78%	0.01%	19.79%
Capitol Police	19.78%	0.01%	19.79%
State Police	33.34%	0.01%	33.35%
Class AA Members:			
Age 60 Retirement	24.85%	0.01%	24.86%
Age 50 Retirement	28.67%	0.01%	28.68%
Park Rangers	28.36%	0.01%	28.37%
Capitol Police	28.36%	0.01%	28.37%
Enforcement Officers	28.67%	0.01%	28.68%
Class A Members:			
Age 60 Retirement	19.88%	0.01%	19.89%
Age 50 Retirement	22.94%	0.01%	22.95%
Park Rangers	22.81%	0.01%	22.82%
Capitol Police	22.81%	0.01%	22.82%
State Police	36.84%	0.01%	36.85%
Enforcement Officers	22.94%	0.01%	22.95%
Class D-4 Legislators	34.40%	0.01%	34.41%
Class E Members	31.50%	0.01%	31.51%

The above group rates result in employer contribution rates (expressed as a percentage of total projected covered compensation for active members in fiscal year 2015-2016) of 25.00% for the SERS Plan, 0.01% for the Benefits Completion Plan and 25.01% in Total.

# State Employees' Retirement System

## General Discussion

The liabilities and costs in this report are based upon actuarial assumptions adopted by the State Employees' Retirement Board (the Board) and funding procedures specified in the SERC. The SERC requires that the Board conduct a study of the actuarial experience of SERS every five years as a basis for setting the actuarial assumptions used in the valuation. A five-year study was conducted and delivered to the Board in January 2011. The Board approved the recommendations of the actuary and the new assumptions were first used in the December 31, 2010 valuation.

The most important actuarial assumptions are the investment return, which is used as the basis for the valuation interest rate, and salary growth. The investment return experience is reviewed annually and as a part of the normal five-year experience study cycle. Based upon the most recent annual review (in early 2015) of the SERS investment data and results, the annual investment return assumption remained at 7.5 percent for the December 31, 2014 valuation. Salary growth is the total of assumed increases in salary rates and career salary growth. It is generally assumed that the salary rates will increase at 3.05 percent per year due to general salary schedule increases and that career salary growth (promotion and longevity growth) will average an additional 3.05 percent per year. Thus, the total average salary increase for an individual will generally be 6.10 percent per year. The investment return and the salary rate increase assumptions are based on an underlying inflation rate of 2.75 percent per year.

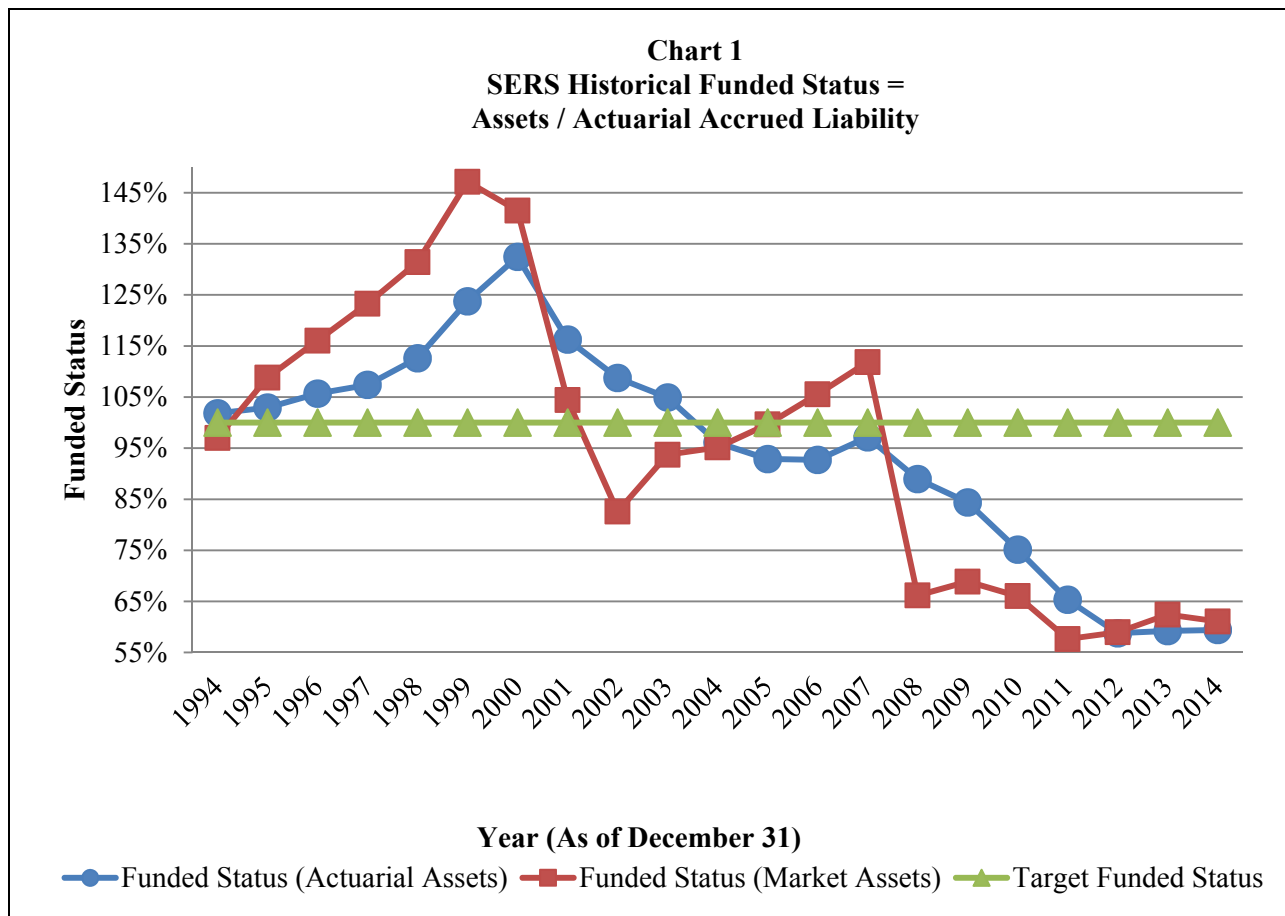
The SERS plan employer contribution is determined as a percent of covered compensation that is the total of (1) the employer normal cost percent and (2) the net amortization of the unfunded liability, but not less than any applicable minimum contribution prescribed by the SERC and not more than the total contribution amount that results from applying the collars established by Act 2010-120 to limit the extent of annual increase in the employer contribution rate. The final total pre-collared employer contribution level as of December 31, 2014 is 31.51 percent of covered compensation, which is the sum of (1) the employer normal cost of 4.95 percent of compensation plus (2) the net amortization of the unfunded liability of 26.56 percent of compensation. To determine the maximum 2015-2016 employer contribution rate under Act 2010-120, we add the fiscal 2015-2016 contribution collar of 4.5 percent of payroll to the final 2014-2015 employer contribution requirement of 20.50 percent of payroll, to produce a result of 25.00 percent of compensation. Therefore, the 2015-2016 employer contribution rate is limited to 25.00 percent of covered compensation, well below the pre-collared contribution level that would otherwise be required. See Schedule O for further discussion of the Act 2010-120 employer contribution collars.

The funded ratio is the ratio of assets to the actuarial accrued liability. As a consequence of the global economic downturn, SERS experienced very unfavorable investment results during calendar 2008. Thus, SERS' funded status, as measured by the funded ratio, declined significantly during 2008, to a level of 66.2 percent based on market value and 89.0 percent based on actuarial value of plan assets as of December 31, 2008. As a result of somewhat more favorable investment results during calendar years 2009 and 2010, the funded ratio based on the market value of assets as of December 31, 2010 was 66.1 percent; however, the funded ratio based on the actuarial value of assets (which recognizes investment losses over a five-year period) decreased to 75.2 percent as of December 31, 2010. With investment results well below expectations during calendar 2011, combined with an increase in the actuarial accrued liability due to the December 31, 2011 interest assumption decrease, the funded ratio

## State Employees' Retirement System

based on market value of assets decreased from 66.1 percent to 57.6 percent, and the funded ratio based on actuarial value of assets decreased from 75.2 percent to 65.3 percent. Investment results above expectations in 2012 resulted in an increase in the funded ratio based on market value from 57.6 percent to 59.0 percent. However, with the final 20 percent of the 2008 investment loss being recognized in 2012, there was a decrease in the funded ratio based on actuarial value from 65.3 percent to 58.8 percent. Favorable investment results in 2013 resulted in an increase in both the market value and actuarial value funded ratios from 59.0 percent to 62.4 percent, and from 58.8 percent to 59.2 percent, respectively. A market return below expectations in 2014 resulted in a decrease in the market value funded ratio from 62.4 percent to 61.1 percent and recognition of prior asset gains through the smoothing method resulted in the actuarial value funded ratio increasing from 59.2 percent to 59.4 percent.

Chart 1 below presents a history of SERS funded ratios, relative to the 100% target funded status.

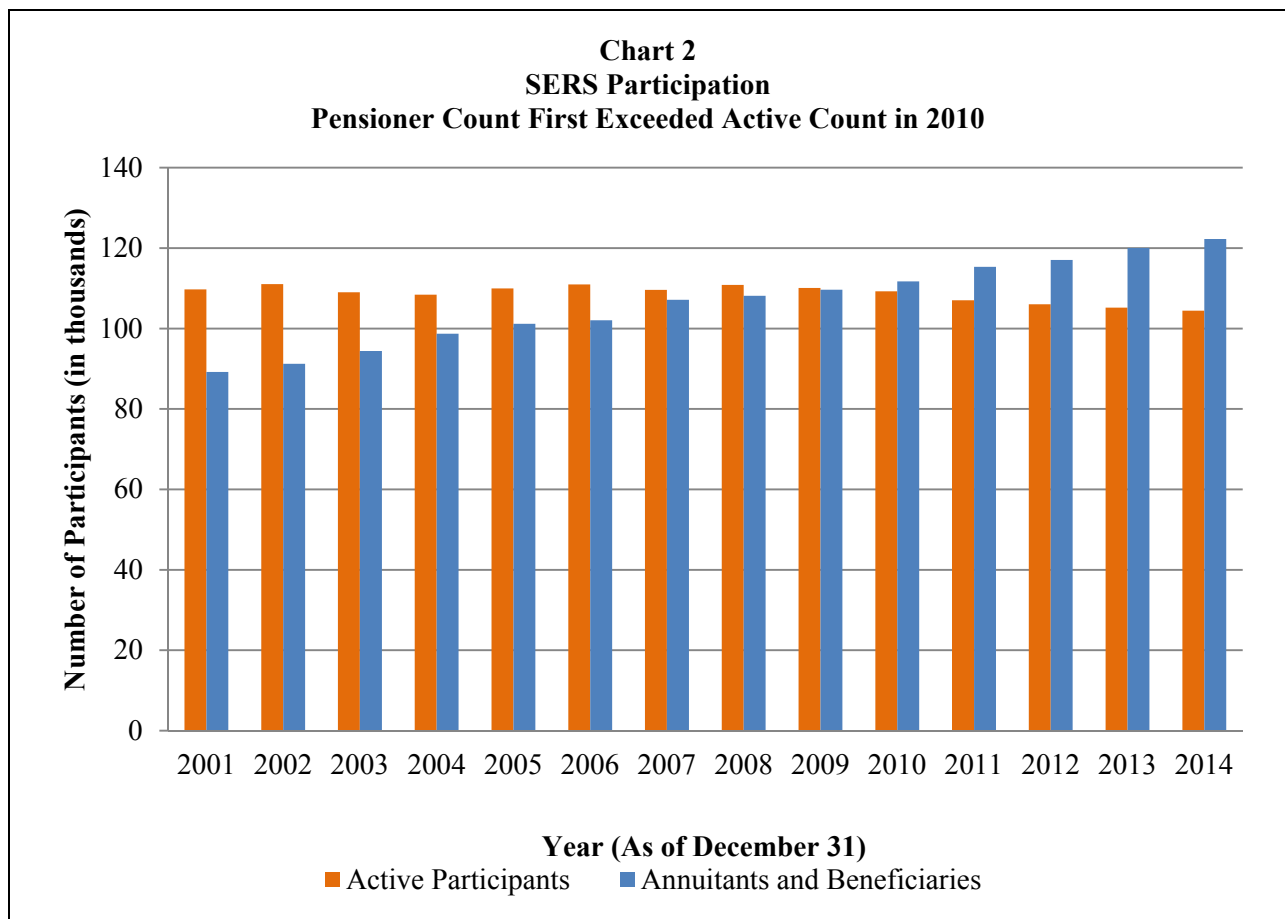




## State Employees' Retirement System

During 2010, the count of pensioners exceeded the count of active participants for the first time in the history of SERS. As of December 31, 2014, the count of pensioners (122,249) further exceeds the count of active participants (104,431), a clear sign of a mature retirement system. Chart 2 below illustrates the maturing of the SERS population since 2001.

Although it was noted previously that the interest rate and salary growth are the most important actuarial assumptions, the maturity of the SERS population heightens the importance of the mortality assumptions. Thus, the updates to the post-retirement mortality assumptions recommended by the actuary every five years based upon SERS' actual ongoing mortality experience, have become increasingly critical to the annual valuation process.

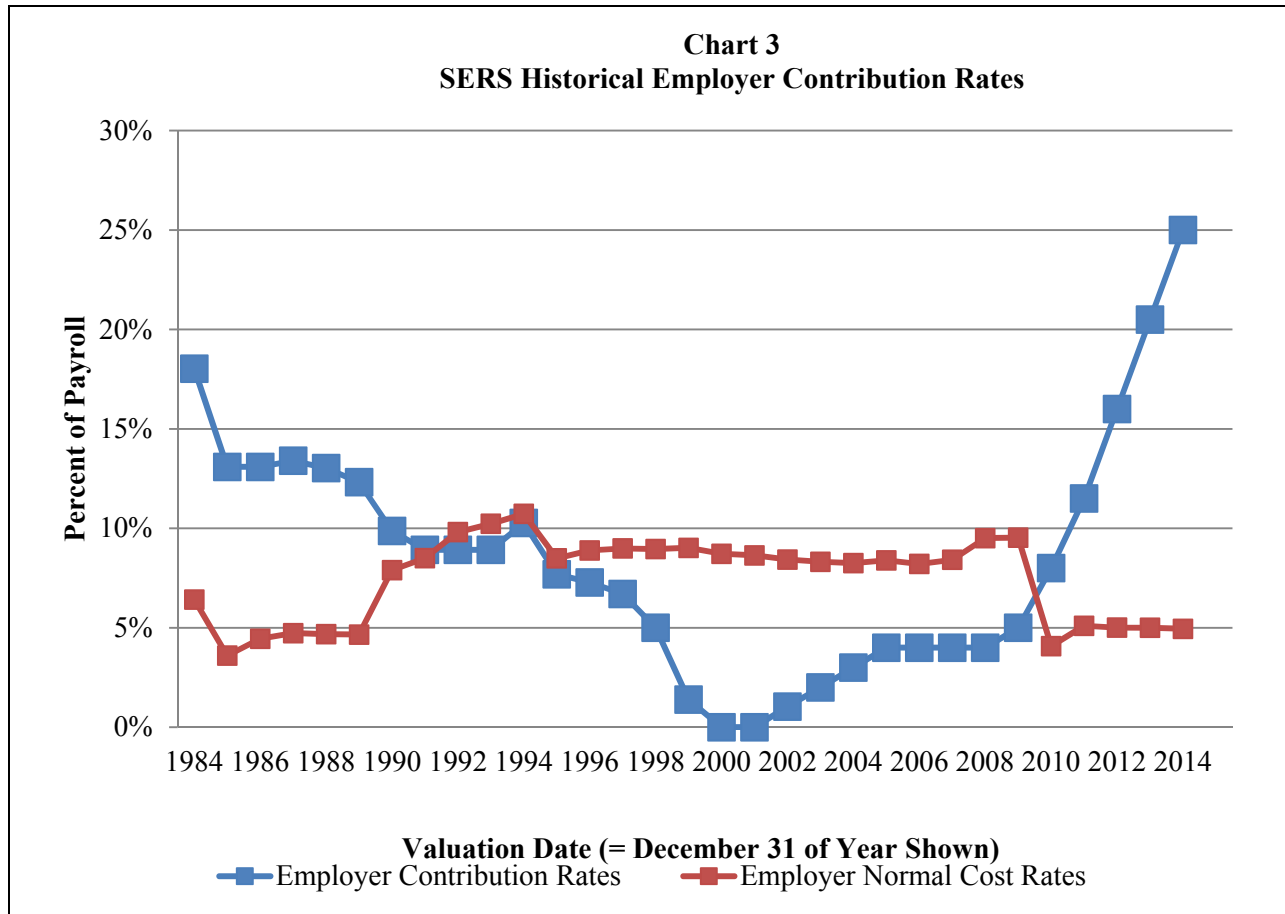


A separate and distinct Benefits Completion Plan provides benefits to certain members whose SERS benefits are limited by IRC Section 415(b) maximum benefit limitations. The Benefits Completion Plan employer contribution requirements for fiscal year 2015-2016, which were determined by a separate December 31, 2014 actuarial valuation, are presented in the Valuation Highlights herein. Otherwise, Benefits Completion Plan costs and liabilities are not included in the schedules of this report.

# State Employees' Retirement System

## History of the Employer Contribution Rate

Chart 3 below shows the history of the employer contribution rate from 1984 through 2014. With some fluctuations, the general trend from 1984 through 2001 had been downward, with the rate declining from the 18 percent range in the years 1983 and 1984 to zero in 2000 and 2001. The investment returns were below the actuarial assumption (then 8.5 percent) in 2000 through 2002. The changes to the amortizations under Act 2003-40 and subsequent investment gains would have kept the contributions from increasing if it had not been for legislated floors that caused the employer contributions to increase between 2002 and 2005. From 2006 through 2014, actual employer contribution rates have been at levels prescribed by law, increasing each year since 2009.



The total employer cost is the actual contribution rate during the succeeding fiscal year. For instance, the rate of 25.00 percent of covered compensation for the December 31, 2014 valuation date will be the employer contribution for the fiscal year beginning July 1, 2015.

## State Employees' Retirement System

### History of Inflation, Investment Return and Salary Growth

Table 1 below shows the rate of inflation, the nominal and real investment return based on the market value of assets, and the nominal and real salary growth for the past twenty years. The nominal rates are the actual investment rate and salary growth. The real rates are the nominal rates adjusted by removing inflation. The inflation rates shown are based on the Consumer Price Index for All Urban Consumers (CPI-U) data. The nominal rate of salary growth is the percentage increase in general pay levels specified by the predominant collective bargaining agreement. This salary growth includes both general pay increases and step increments but excludes career salary growth (that is, pay changes resulting from promotions or longevity growth).

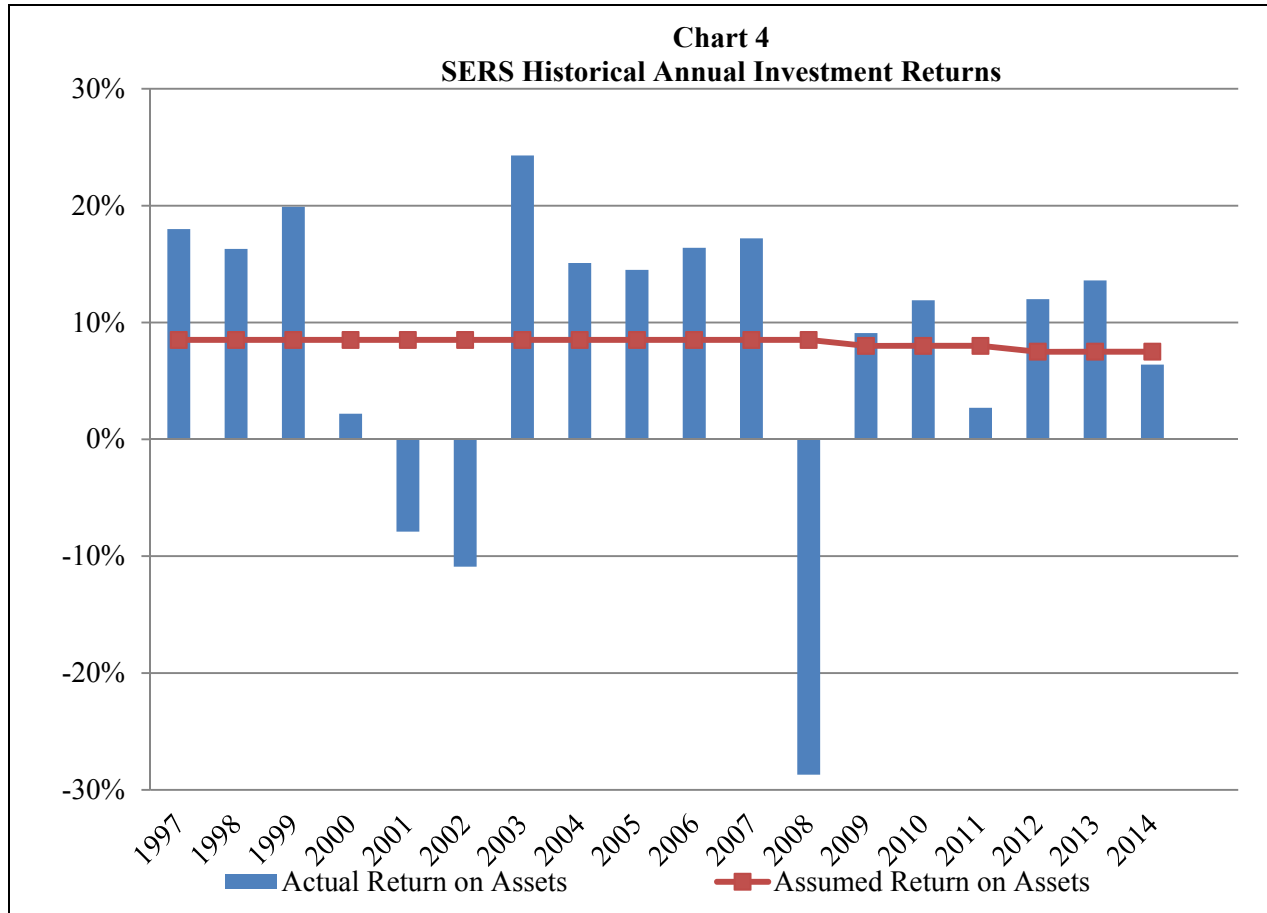
<b>Table 1: Comparison of Annual Rates of Growth</b>					
<b>Year</b>	<b>Inflation</b>	<b>Investment Return</b>		<b>Salary Growth</b>	
		<b>Nominal</b>	<b>Real</b>	<b>Nominal</b>	<b>Real</b>
1995	2.5	25.5	22.4	3.8	1.2
1996	3.3	15.9	12.2	2.0	(1.3)
1997	1.7	18.0	16.0	3.0	1.3
1998	1.6	16.3	14.5	3.0	1.4
1999	2.7	19.9	16.8	3.0	0.3
2000	3.4	2.2	(1.1)	3.0	(0.4)
2001	1.6	(7.9)	(9.3)	3.3	1.7
2002	2.4	(10.9)	(13.0)	3.5	1.1
2003	1.9	24.3	22.0	2.0	0.1
2004	3.3	15.1	11.4	1.9	(1.4)
2005	3.4	14.5	10.7	3.0	(0.4)
2006	2.5	16.4	13.6	3.5	1.0
2007	4.1	17.2	12.6	2.8	(1.2)
2008	0.1	(28.7)	(28.8)	3.0	2.9
2009	2.7	9.1	6.2	3.0	0.3
2010	1.5	11.9	10.2	3.0	1.5
2011	3.0	2.7	(0.3)	3.0	0.0
2012	1.7	12.0	10.1	1.0	(0.7)
2013	1.5	13.6	11.9	2.8	1.3
2014	0.8	6.4	5.6	3.5	2.7
<b>Average 1995-2014</b>	<b>2.3%</b>	<b>8.8%</b>	<b>6.4%</b>	<b>2.9%</b>	<b>0.6%</b>

The averages represent the geometric averages of all of the rates over the 20-year period, not the arithmetic averages.

## State Employees' Retirement System

Chart 4 below presents a 18-year history of SERS annual investment returns relative to the actuarially assumed returns of:

- 8.5% for 1997 through 2008,
- 8.0% for 2009 through 2011 and
- 7.5% for 2012 through 2014



# State Employees' Retirement System

## Comments on Schedules

### Employer Contribution Rate

Schedules A and B summarize the development of the employer contribution rate before allocation by group. The employer contribution is equal to the sum of (1) the employer share of the normal cost and (2) amortization of the unfunded liability.

The normal cost is the level percentage of compensation needed to fund the liability for any prospective benefits earned by new active members over the period of their actual service. The normal cost calculation uses data for all active members in Class A-3 (65) who had not yet completed one year of credited service. The employer share of the normal cost decreased from 5.00 percent in 2013 to 4.95 percent in 2014. The normal cost decreased due to the change in the demographics of the new entrant population.

Portions of the unfunded liability are amortized over either 10 years or 30 years as required by the SERC. Under Act 120, the total December 31, 2009 unfunded liability was amortized over 30 years as part of a fresh start that combined all of the unfunded liability amortizations into one amortization. Net losses in 2010 and after were amortized over 30 years. The total unfunded liability as of December 31, 2014 was \$18.17 billion. As of December 31, 2013, the total unfunded liability was \$17.90 billion.

Schedule B shows the allocation of the total unfunded liability by year into those liabilities being amortized over 30 years. All amortization payments are level dollar amounts over the applicable amortization period. There are currently no 10-year amortizations. The total net charge for the amortization of the unfunded liability is 26.56 percent of the total projected covered compensation for the 2015-2016 fiscal year.

The employer contribution rate is equal to the total of the normal cost and the amortization of the unfunded liabilities, but not less than the normal cost and not more than the rate based on the collar (which limits the contribution increases during the next several years) applicable to the 2015/2016 employer contribution rate. Because there were no costs added by legislated benefit changes since the prior valuation, the employer contribution rate calculated as a result, 25.00 percent of covered compensation, will be applied for the fiscal year beginning July 1, 2015.

### Employer Contribution Rates by Group

Schedule C summarizes the development of the employer contribution rate for each group of members with different benefits. The Class A-3 (65) rate is used to determine the base contribution rate because the majority of new members enter that class. The base employer contribution rate for Class A-3 benefits is 17.17 percent of compensation.

The employer contribution rate for each class is a function of the Class A-3 (65) rate. Three adjustments are made to develop the Class rates. The first is to add the cost of earlier full retirement conditions if applicable. The second is to multiply by the applicable adjustment factor relative to the Class A-3 benefit value. Third, the Park Rangers, Capitol Police and State Police Officers are also charged the amount necessary to fund the past service cost of benefit improvements that were

## State Employees' Retirement System

effective in prior years. These charges are further explained in Schedule O. The complete schedule of contributions by group is shown in Table 2.

<b>Table 2</b> <b>Employer Contribution Rate by Group</b> <b>Fiscal Year 2015/2016</b> <b>(Excluding Benefits Completion Plan Contribution)</b>	
Class A3/A4	
Age 65 benefit	17.17%
Age 55 benefit	19.81
Park Rangers	19.78
Capitol Police	19.78
State Police	33.34
Class AA	
Age 60 benefit	24.85
Age 50 benefit	28.67
Park Rangers	28.36
Capitol Police	28.36
Enforcement Officers	28.67
Class A	
Age 60 benefit	19.88
Age 50 benefit	22.94
Park Rangers	22.81
Capitol Police	22.81
State Police	36.84
Enforcement Officers	22.94
Class D-4 Legislators	34.40
Class E Members	31.50

Schedule D shows the development of the shared risk member contributions, in accordance with Act 2010-120. No shared risk contribution applies for the 2015-2016 fiscal year.

### **Change in Employer Contribution Rate**

Schedule E contains an analysis of the change in the employer contribution rate and unfunded liability from the 2013 to the 2014 valuation.

The largest increase in the unfunded liability, \$740.4 million, resulted from underfunding due to the Act 2010-120 employer contribution collars. This loss of \$740.4 million resulted in an increase in the employer cost of 1.04 percent of compensation.

Another increase in the unfunded liability was the result of demographic experience. Differences between actual and expected demographic experience of the covered population resulted in a liability

## State Employees' Retirement System

increase of \$35.2 million. This additional liability resulted in an increase in the employer cost of 0.06 percent of compensation.

The smallest increase in the unfunded liability was due to changes in the demographics of the new entrant population, which resulted in a loss of \$31.6 million. The increase in unfunded liability cost of 0.04 percent was offset by a 0.05 percent decrease in the normal cost, for a net decrease in cost of 0.01 percent of compensation.

The largest decrease in the unfunded liability, \$238.0 million, resulted primarily from recognition (under the five-year asset smoothing method) of three years of asset gains totaling \$682.9 million, which more than offset two years of losses totaling \$444.9 million. This net gain of \$238.0 million resulted in a decrease in the employer cost of 0.33 percent of compensation.

Another decrease in the unfunded liability, \$86.9 million, resulted from pay increases being lower than expected. This gain resulted in a decrease in the employer cost of 0.12 percent of compensation.

### **Actuarial Balance Sheet and Account Balance Transfers**

Schedule F contains the actuarial balance sheet that compares the total assets and liabilities of \$51.8 billion. The assets include current assets and the present value of future contributions. The liabilities include the present value of all benefits to current active and retired members.

Each year the account balances in the three benefit payment accounts are compared to the actuarial liabilities developed in the valuation. If needed, transfers are made to bring the accounts into balance with the liabilities. The accounts go out of balance during the year as a result of differences between actual experience and the reserves set for retirees. In 2014, a transfer of \$124.1 million was made from the State Accumulation Account to the Annuity Reserve Account to keep the latter account in balance. There were also transfers of \$0.4 million and \$1.2 million from the State Accumulation Account to the Enforcement Officers' Benefit Account and the State Police Benefit Account, respectively, to keep these accounts in balance. No other transfers were necessary.

The details of these transfers are shown in Schedule G.

## State Employees' Retirement System

### Accounting Disclosure Statements

Schedule H addresses disclosure information required by the Governmental Accounting Standards Board (GASB). Major changes have occurred in GASB's reporting and disclosure requirements since our previous actuarial valuation/report. Specifically, new GASB Statements No. 67 and 68 have replaced prior GASB Statements No. 25 and 27, respectively. As a result, beginning this year, Hay Group will prepare and issue our first annual actuarial report covering SERS information required by GASB (Statements No. 67 and 68). Therefore, we will be issuing two separate annual actuarial reports, this one to cover SERS funding and the other to cover SERS accounting and disclosure.

Over past years, this report has presented the disclosure information required under GASB Statement No. 25, including the "Schedule of Funding Progress" and the "Schedule of Employer Contributions," and commentary relating to SERS' annual employer contributions versus the GASB minimum levels. Although these schedules are being discontinued by GASB, it is felt that this information and our commentary continue to be of interest to readers of this report. Therefore, Schedule H once again includes information as required under the former GASB accounting and disclosure requirements:

Page 2 of Schedule H shows funding progress from December 31, 1995 through December 31, 2014.

Page 3 of Schedule H shows a comparison of the actual contributions to the system over recent years to the Annual Required Contribution (ARC) as defined by GASB Statement No. 25.

GASB Statement No. 25 defined the ARC to be equal to the employer normal cost plus an amount to amortize the unfunded actuarial accrued liability over an acceptable amortization period. The 2015-2016 employer contribution is lower than the ARC. GASB Statement No. 25 required that the net unfunded liability be funded over a period of no more than 30 years. Because the employer contribution collars under Act 120 will result in employer contributions for a number of years that will be lower than the pre-collared contributions, we anticipate that the actual employer contributions to SERS will be lower than the ARC through June 30, 2015. Thereafter, provided that employer contributions are made in accordance with current law, we expect employer contributions to exceed the GASB minimum. Overall, the amortization schedules are reasonable and, if met, will assure the long-term financial soundness of SERS.

Schedule I shows the results of the solvency test. A short-term solvency test is one means of checking a pension system's progress under its funding program. In this solvency test, the SERS assets are compared with the actuarial accrued liabilities. The liabilities are classified into:

- Liability for active participant contributions in the Fund,
- Liability for future benefits to present annuitants and beneficiaries, and
- Liability for service already rendered by the active participants.

The schedule shows that from 1992 through 2003 the total actuarial accrued liability was fully covered by the assets. In 2004 the funded ratio dropped below 100 percent and it is currently at 59.4 percent. Absent unusual circumstances, the funded status of defined benefit plans will be below 100 percent and gradually approach 100 percent funding as liabilities become fully amortized. The State Employees' Retirement Fund had exceeded 100 percent of liabilities as a result of the high level of investment returns between 1985 and 1999. The funded ratio dropped below 100 percent largely as a result of the low investment returns of 2000 to 2002 and 2008, the Act 2001-9 benefit increases, the 2002-2003 COLAs, and the amortization schedule. Also, the



## State Employees' Retirement System

implementation of Act 2010-120 for the December 31, 2010 valuation led to a lower normal cost and a higher accrued liability (and unfunded accrued liability). The reduction in the assumed annual investment return from 8.0 percent to 7.5 percent on December 31, 2011 resulted in a higher accrued liability (and unfunded accrued liability).

The current funding policy will eventually restore the funded ratio to 100 percent provided that contributions are made as provided in current law. SERS is being funded in accordance with generally accepted actuarial principles and procedures even though the accrued liabilities are temporarily greater than the assets.

### Plan Assets

Schedule J summarizes the development of the actuarial value of assets as of December 31, 2014. The assets are based on the financial statements prepared by SERS. The asset valuation method smoothes out year-to-year fluctuations in the market value. The approach gradually recognizes, over a 5-year period, the differences between total investment return and the actuarial assumed annual rate of return (8.5 percent prior to 2009; 8.0 percent for 2009 through 2011; and 7.5 percent for 2012 and later). This smoothing method recognizes 20 percent of the 2014 asset loss of \$0.4 billion this year, with the remainder to be recognized over the next four years.

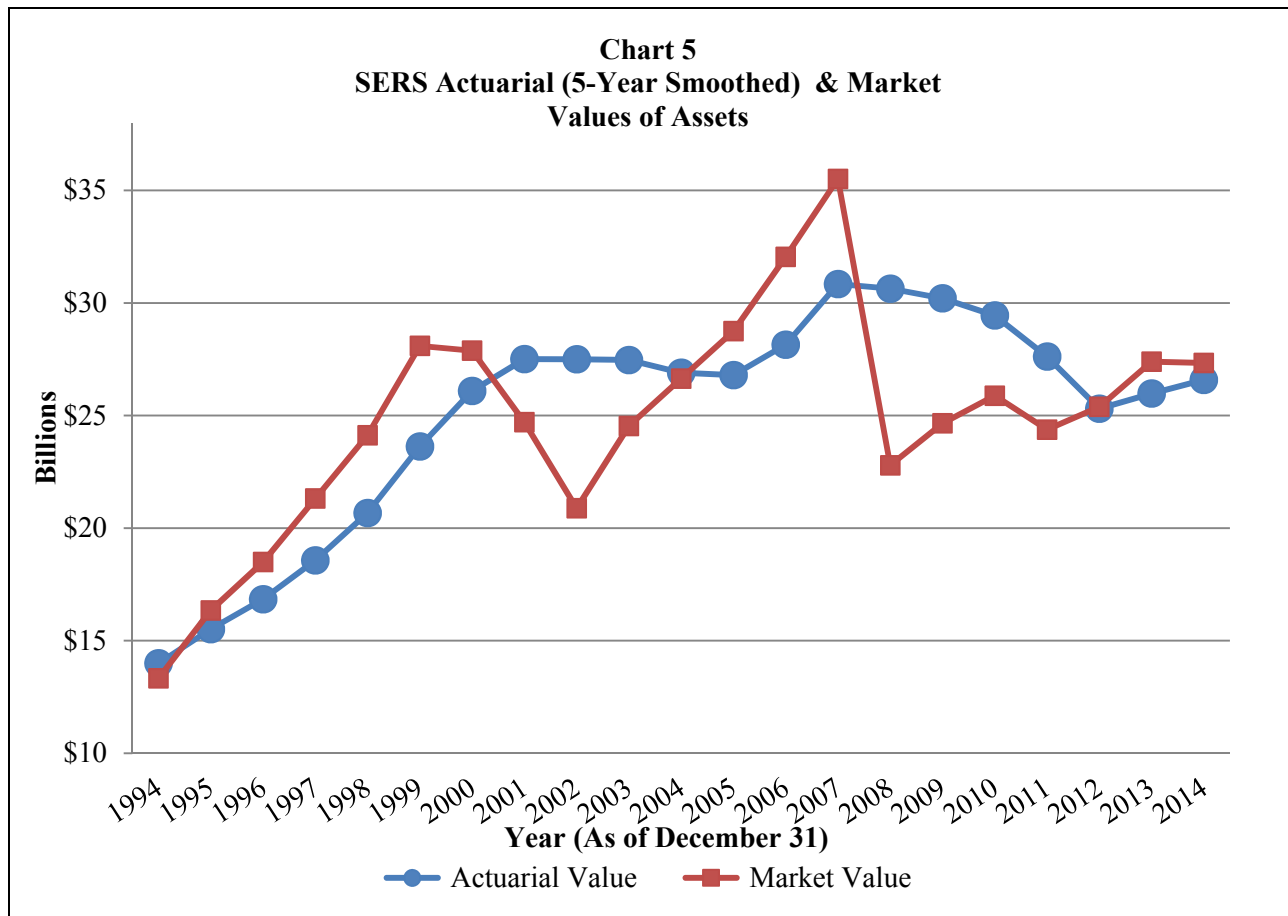


Chart 5 above presents a history since 1994 of SERS asset values, including both the actuarial value and the market value.

## State Employees' Retirement System

### **Projection**

Schedule K shows the number of participants, contributions, and benefits from 1996 through 2014 with a projection through 2025. The first page of Schedule K shows new annuitants, annuitant deaths, new beneficiaries, and beneficiary deaths during the year. The second and third pages of Schedule K show the projection of employer and employee contributions and a projection of the benefits and expenses. The projected employee and employer contributions are shown in dollars and as a percentage of compensation.

The second page of the Schedule K projection shows projected contributions under Act 120, fully reflecting the employer contribution collars under Act 120. The third page of the Schedule K projection also projects contributions under Act 120; however, this projection presents future employer contribution rates without applying future (after June 30, 2015) Act 120 contribution collars; thus, these projected employer contributions reflect the uncollared employer contribution levels.

### **Participant Data**

Sections I and II of Schedule L provide a distribution of the total of the active, inactive, and terminated vested participants as of December 31, 2014 by benefit class, sex, age, and length of service. Inactive participants include employees on furlough as well as employees with prior SERS service currently participating in the Pennsylvania Public School Employees' Retirement System (PSERS). The table also shows the average annualized salary in 2014 by age group and sex. Section III of the schedule shows retired annuitants, disabled annuitants, survivors and beneficiaries receiving benefits by age, sex, and benefit amounts.

Although we have made tests to check for reasonableness and consistency, we have not independently audited the data, which were submitted by SERS. As appropriate, we have made certain adjustments to the SERS data, including the use of a minimum annual salary assumption of \$20,000.

Section III of Schedule L shows the monthly annuities that were being paid as of December 31, 2014. Total benefits from the fund include lump sum payments and death benefits so these are much higher than the sum of annuities shown in Schedule L and in the highlights.

### **Plan Provisions**

Schedule M contains a summary of the principal provisions of the plan. As a consequence of Act 2010-120 being signed into law in November 2010 and becoming effective (for most purposes) January 1, 2011, there were significant changes in plan provisions in 2010.

### **Actuarial Assumptions**

Schedule N summarizes the actuarial assumptions used for the valuation. The two types of assumptions are economic assumptions, such as the investment return and salary growth assumptions, and demographic assumptions, such as the assumed rates of retirement and mortality.

## **State Employees' Retirement System**

For the December 31, 2010 valuation, as a result of the 2006-2010 actuarial experience study and the large number of actuarial assumption changes that were recommended, changes were made to most of the actuarial assumptions used for the SERS actuarial valuation. The 8.0 percent annual investment return assumption was among the assumptions reviewed as a part of the 2006-2010 study, and the study results supported continuing with 8.0 percent for the December 31, 2010 valuation.

Based upon subsequent review of SERS investment data and results, the Board approved a reduction in the assumed annual investment return from 8.0 percent to 7.5 percent effective as of the December 31, 2011 actuarial valuation and continued use of the 7.5 percent assumption through the December 31, 2014 actuarial valuation.

### **Actuarial Methods**

Schedule O explains the asset valuation and funding method used in the valuation, and the determination of the annual contribution, including a discussion of the Act 120 employer contribution collars. The asset valuation method spreads investment gains and losses over five years. The funding method provides for reasonable levels of contribution that will fund the cost of future benefits with a credit for amortization of the excess of assets over liabilities. Schedule O also explains how the individual class rates are determined. The final section of Schedule O discusses the plan provisions that are not valued.

### **Glossary**

Schedule P defines certain terms used in this actuarial report.

**State Employees' Retirement System**  
**Unfunded Liability and Normal Cost as of December 31, 2014**

I.	Present Value of Benefits:	
	A) Active and Inactive Participants	
	1) Superannuation and Withdrawal	\$ 26,015,271,144
	2) Disability	968,422,129
	3) Death	865,818,475
	4) Refunds	52,775,160
	5) Special Police and Enforcement Officer Benefits	-
	6) Subtotal	\$ 27,902,286,908
	B) Annuitants and Beneficiaries	23,872,657,599
	C) Total	\$ 51,774,944,507
II.	Present Value of Member and Employer Contributions:	
	A) Employer Portion of Normal Cost	\$ 3,126,602,196
	B) Member Contributions	3,691,656,128
	C) Administrative Expenses	(242,860,530)
	D) Fiscal Year Amortization Payable	448,876,519
	E) Total	\$ 7,024,274,313
III.	Actuarial Accrued Liability: (I) - (II)	\$ 44,750,670,194
IV.	Actuarial Value of Assets	\$ 26,584,948,430
V.	Unfunded Liability (III) - (IV)	\$ 18,165,721,764
VI.	Employer Normal Cost Rate	
	A) Total Normal Cost Rate for new active members to fund:	
	1) Superannuation and Withdrawal	9.60%
	2) Disability	0.78%
	3) Death	0.50%
	4) Refunds	<u>0.32%</u>
	5) Total	11.20%
	B) Member Contribution Rate	6.25%
	C) Employer Normal Cost Rate (A) - (B)	4.95%

**State Employees' Retirement System**  
**Employer Contribution Rate in Fiscal Year 2015 - 2016**

	<u>Funding Period</u>		Initial Amount of Liability	Outstanding Balance as of 12/31/14	Annual Payment Amount	Payment as a Percent of Compensation*
	Initial Years	From July 1				
<b>I. Amortization of Liability (Asset) For:</b>						
A) Liability Fresh Start	30	2010	\$5,592,323,524	\$5,287,371,589	\$474,333,657	7.88%
B) Changes in 2010	30	2011	4,192,690,873	4,014,738,408	355,302,793	5.90%
C) Changes in 2011	30	2012	5,018,078,343	4,861,292,818	424,886,895	7.06%
D) Changes in 2012	30	2013	3,244,242,829	3,179,137,965	274,694,050	4.56%
E) Changes in 2013	30	2014	344,271,135	340,941,608	29,149,862	0.48%
F) Changes in 2014	30	2015	482,239,376	<u>482,239,376</u>	<u>40,831,804</u>	<u>0.68%</u>
<b>Total</b>				<b>\$ 18,165,721,764</b>	<b>\$ 1,599,199,061</b>	<b>26.56%</b>
<b>II. Employer Normal Cost</b>						<b>4.95%</b>
<b>III. Total Employer Cost before Act 2010-120 = (I) + (II)</b>						<b>31.51%</b>
<b>IV. Total Employer Cost (III), reflecting the 25.00 percent contribution prescribed by Act 2010-120</b>						<b>25.00%</b>

\* The payment is expressed as a percentage of the total projected covered compensation for active members in fiscal year 2015-2016 of \$6,021,688,000. Percentages may not add due to rounding.

**State Employees' Retirement System**

**Employer Contribution Rate by Group  
(excluding Benefits Completion Plan rate)**

Employer Group (1)	Base Contribution Rate (2)	Age 50 or 55 Retirement Adjustment (3)	Multiplier Adjustment* (4)	Past Liability Adjustment (5)	Adjusted Contribution Rate** (6)	Projected 2015-2016 Compensation (7)	Employer Contribution Amount (8)
Class A-3 and A-4 - Age 65 Retirement	17.17%		1.0000		17.17%	\$ 945,913,000	\$ 162,413,262
Class AA - Age 60 Retirement	17.17%		1.4472		24.85%	3,418,372,000	849,465,442
Class A - Age 60 Retirement	17.17%		1.1578		19.88%	30,086,000	5,981,097
Class A-3 and A-4 - Age 55 Retirement	17.17%	2.64%	1.0000		19.81%	165,200,000	32,726,120
Class AA - Age 50 Retirement (Including Enforcement Officers)	17.17%	2.64%	1.4472		28.67%	860,199,000	246,619,053
Class A - Age 50 Retirement (Including Enforcement Officers)	17.17%	2.64%	1.1578		22.94%	14,948,000	3,429,071
Class A-3 and A-4 - Park Rangers & Capitol Police	17.17%	2.00%	1.0000	0.61%	19.78%	3,867,000	764,893
Class AA - Park Rangers & Capitol Police	17.17%	2.00%	1.4472	0.61%	28.36%	10,173,000	2,885,063
Class A - Park Rangers & Capitol Police	17.17%	2.00%	1.1578	0.61%	22.81%	134,000	30,565
Class A-3 and A-4 - State Police	17.17%	2.64%	1.4724	4.17%	33.34%	51,751,000	17,253,783
State Police - Other	17.17%	2.64%	1.6491	4.17%	36.84%	370,115,000	136,350,366
Class D4	17.17%	2.64%	1.7367		34.40%	13,777,000	4,739,288
Class E	17.17%		1.8347		31.50%	137,153,000	43,203,195

Total\*\*\*      \$ 6,021,688,000    \$ 1,505,861,199

\* The multiplier adjustment is the adjustment for the employer group contribution rate. Because the majority of new active members of SERS will be covered under Class A-3 (65), the 2.0 percent accrual rate for that Class is used to determine the base contribution rate. Column (4) is the applicable adjustment factor relative to the Class A-3 benefit value.

\*\* The adjusted contribution rate is [ (2) + (3) ] times (4) + (5).

\*\*\* The total employer contribution (\$1,505,861,199) is approximately equal to the average employer contribution rate from Schedule B (25.00 percent) times the total projected covered compensation of \$6,021,688,000. The base contribution rate of 17.17 percent was determined as the percentage needed to produce employer contribution amounts by employer group that sum to \$1,505,861,199.

NOTE: See Schedule O, Section IV for further discussion of this schedule.

**State Employees' Retirement System  
Development of Shared Risk Member Contributions**

<u>Calendar Year</u>	<u>Actual Return</u>	<u>Expected Return</u>	<u>Excess of Expected Over Actual</u>		
2016	TBD	7.5%	TBD		
2015	TBD	7.5%	TBD		
2014	6.4%	7.5%	1.1%		
2013	13.6%	7.5%	-6.1%	July 1, 2014 Shared Risk Basis	July 1, 2017 Shared Risk Basis
2012	12.0%	7.5%	-4.5%		
2011	2.7%	8.0%	5.3%		
2011-2013	9.3%/year**	7.7%/year*	-1.6%		
2011-2016	TBD	TBD	TBD		

- 1) Shared Rate for Class A-3 and A-4 Members as of June 30, 2014: 0.0%
- 2) Calculation of 3-Year Annualized Returns for 2011-2013:
  - a) \* Expected:  $[(1+0.08) \times (1+0.075) \times (1+0.075)]^{(1/3)} - 1$  7.7%
  - b) \*\* Actual:  $[(1+0.027) \times (1+0.120) \times (1+0.136)]^{(1/3)} - 1$  9.3%
  - c) = a) - b) -1.6%
- 3) Adjustment to Shared Rate Based on Initial 3-Year Period (2011-2013)  
 Since 2c) is not greater than 1.0%, Adjustment to Shared Rate = 0% 0.0%
- 4) New Shared Rate Effective July 1, 2014 = (1) + (3): 0.0%

Under the Shared Risk provision of Act 2010-120, higher member contribution rates could have become effective in 2014 if SERS investments had underperformed. The first potential Shared Risk Contribution Rate (Shared Rate) was determined based upon the actual SERS investment returns earned during the three calendar year period ended December 31, 2013. The 2011 to 2013 return information and Shared Rate calculations shown above support the conclusion that no Shared Rate was applicable for the fiscal year beginning July 1, 2014. That is, since the expected annual return over the three-year period 2011-2013 (7.7%) was not more than 1.0% greater than the actual annual return (9.3%), the Shared Rate does not increase from 0.0% to 0.5%. Thus, no Shared Rate became effective July 1, 2014, and a 0.0% Shared Rate will apply through June 30, 2017.

As of December 31, 2016, the next potential adjustment to the Shared Rate will be determined based upon investment returns over the six calendar years 2011 through 2016. Any resulting adjustment will be effective July 1, 2017 and will apply for three years, through June 30, 2020. If the expected return over the 6 calendar year period: (i) is greater than the actual return by more than 1.0%, then the Shared Rate will increase by 0.5%, (ii) is equal to or less than the actual return, then the Shared Rate will decrease by 0.5%, or (iii) is greater than the actual return by less than 1.0%, then the Shared Rate will remain unchanged. Note: Given that the Shared Rate will be 0.0% from July 1, 2014 through June 30, 2017 and the Shared Rate can never be less than 0.0%, the decrease by 0.5% referred to in (ii) of the preceding sentence cannot occur as of July 1, 2017.

As of December 31, 2019, the Shared Rate adjustment will be measured based upon the returns over the nine calendar years 2011 through 2019. As of December 31, 2022 and every three years thereafter, the Shared Rate adjustment will be based upon the returns over the preceding ten calendar years.

In no case will the Shared Risk Contribution Rate be less than 0.0% or greater than 2.0%. Also, should the employer contribution level be below the amount prescribed under Act 2010-120 in any fiscal year, the Shared Risk Contribution Rate will revert to zero.



**State Employees' Retirement System**  
**Analysis of the Change in Employer Contribution Rate**

	<u>Normal</u> <u>Cost</u>	<u>Unfunded</u> <u>Liability</u>	<u>Total</u>
I. December 31, 2013 Valuation	5.00%	26.41%	31.41%
II. Changes in the December 31, 2014 Valuation:			
A) Additional cost due to Act 120 contribution collar restrictions		1.04%	1.04%
B) Gain from investment earnings (net, during 2010-2014)		-0.33%	-0.33%
C) Pay increases different than assumptions		-0.12%	-0.12%
D) Differences between actual and expected demographic experience		0.06%	0.06%
E) Change in demographics of new entrants	-0.05%	0.04%	-0.01%
F) Change in amortization due to change in payroll	<u>0.00%</u>	<u>-0.54%</u>	<u>-0.54%</u>
G) Total Change	-0.05%	0.15%	0.10%
III. December 31, 2014 Valuation: I + II(G)	4.95%	26.56%	31.51%

**Analysis of the Change in the Unfunded Liability**

I. December 31, 2013 Unfunded Liability	\$ 17,899,395,019
II. Expected Amortization Payment	1,558,367,257
III. Expected Liability as of December 31, 2014 [ ( I x 1.075 ) - II ]	\$ 17,683,482,388
IV. Change in Liability Due to:	
A) Additional cost due to Act 120 contribution collar restrictions	\$ 740,401,477
B) Gain from investment earnings (net, during 2010-2014)	(237,981,899)
C) Pay increases different than assumptions	(86,914,129)
D) Differences between actual and expected demographic experience	35,152,087
E) Change in demographics of new entrants	<u>31,581,840</u>
F) Total change	\$ 482,239,376
V. December 31, 2014 Unfunded Liability: III + IV(F)	\$ 18,165,721,764

**State Employees' Retirement System**  
**Actuarial Balance Sheet as of December 31, 2014**

**ASSETS**

**Present Assets:**

Members' Savings Account	\$ 4,733,833,288
Annuity Reserve Account	21,648,579,554
State Police Benefit Account	2,179,406,183
Enforcement Officers' Benefit Account	44,671,862
State Accumulation Account *	(1,273,581,833)
Supplemental Annuity Account	<u>-</u>
Total Present Assets (Market Value)	\$ 27,332,909,054
Adjustment to Smooth Market Fluctuations	(747,960,624)
Total Present Assets (Actuarial Value)	\$ 26,584,948,430

**Present Value of Future Contributions**

Normal Cost Contributions (Employer)	\$ 3,126,602,196
Members' Contributions (Employee)	3,691,656,128
Accrued Liability Amortization (Employer)	18,165,721,764
Supplemental Annuity Amortization (Employer)	-
Administrative Expenses	(242,860,530)
Fiscal Year Amortization Payable	<u>448,876,519</u>
Total Future Contributions	<u>\$ 25,189,996,077</u>
Total Assets	<u><u>\$ 51,774,944,507</u></u>

\* Includes \$3,833,226 in directed commissions.

**LIABILITIES**

**Present Value of Benefits Payable to Annuitants and Beneficiaries from:**

Annuity Reserve Account	\$ 21,648,579,554
State Police Benefit Account	2,179,406,183
Enforcement Officers' Benefit Account	<u>44,671,862</u>
Total for Annuitants and Beneficiaries	\$ 23,872,657,599

**Present Value of Benefits to Active and Inactive Members from:**

Members' Savings Account and State Accumulation Account	
Superannuation and withdrawal	\$ 26,015,271,144
Disability	968,422,129
Death	865,818,475
Refunds	<u>52,775,160</u>
Subtotal	\$ 27,902,286,908

Total Present Value of Benefits to Active and Inactive Members	<u>\$ 27,902,286,908</u>
Total Liabilities	<u><u>\$ 51,774,944,507</u></u>

**State Employees' Retirement System**  
**Required Transfers Within SERS Accounts**

I. Annuity Reserve Account

Balance as reported by SERS	\$ 21,524,500,964
Transfer from State Accumulation Account	124,078,590
Transfer to Supplemental Annuity Account	<u>-</u>
December 31, 2014 balance after transfers	\$ 21,648,579,554

II. State Accumulation Account \*

Balance as reported by SERS	\$ (1,147,889,937)
Transfer to Enforcement Officers' Benefit Account	(404,523)
Transfer to State Police Benefit Account	(1,208,783)
Transfer to Annuity Reserve Account	<u>(124,078,590)</u>
December 31, 2014 balance after transfers	\$ (1,273,581,833)

III. Enforcement Officers' Benefit Account

Balance as reported by SERS	\$ 44,267,339
Transfer from State Accumulation Account	404,523
Transfer from Supplemental Annuity Account	<u>-</u>
December 31, 2014 balance after transfers	\$ 44,671,862

IV. State Police Benefit Account

Balance as reported by SERS	\$ 2,178,197,400
Transfer from State Accumulation Account	1,208,783
Transfer from Supplemental Annuity Account	<u>-</u>
December 31, 2014 balance after transfers	\$ 2,179,406,183

V. Supplemental Annuity Account

Balance as reported by SERS	\$ -
Transfer from Annuity Reserve Account	-
Transfer to State Police Benefit Account	-
Transfer to Enforcement Officers' Benefit Account	<u>-</u>
December 31, 2014 balance after transfers	\$ -

\* Balance includes \$3,833,226 in directed commissions.

# State Employees' Retirement System

## Accounting Disclosure Statements

### Introduction

SERS provides retirement benefits to the employees of the Commonwealth of Pennsylvania and is a cost-sharing, multiple-employer defined benefit pension plan. The Governmental Accounting Standards Board (GASB), pursuant to Statement No. 67, *Financial Reporting for Pension Plans*, and Statement No. 68, *Accounting and Financial Reporting for Pensions* (hereafter Statements 67 and 68), addresses accounting and financial reporting for the activities of pension plans, like SERS, that provide pensions to employees of state governmental employers.

It should be noted that:

- Statement 67 recently replaced the requirements of GASB Statement No. 25, *Financial Reporting for Defined Benefit Pension Plans and Note Disclosures for Defined Contribution Plans*, effective for financial statements for fiscal years ending on or after June 30, 2014, and
- Statement 68 will replace the requirements of GASB Statement No. 27, *Accounting for Pensions by State and Local Governmental Employers*, effective for fiscal years ending on or after June 30, 2015.

Statement 67 is designed for financial reporting by pension plans and Statement 68 is designed for financial reporting by entities that participate in pension plans. The objective of both statements is to provide more useful, transparent, and comparable financial information related to pensions.

Among the schedules that are no longer required, that had been required disclosures under Statement 25 for the past 7 to 8 years, are the “Schedule of Funding Progress” and the “Schedule of Employer Contributions.” These schedules, both of which have been included in this actuarial report in past years, remain of interest to many readers of this report. Therefore, we have updated these two schedules to reflect the December 31, 2014 actuarial valuation and they are included on the next two pages, for information purposes. As well, we have included on the pages that follow these schedules, again for information purposes, our notes and commentary relating to the disclosures formerly required by GASB Statement No. 25.

**NOTE:** The new reporting requirements of Statements No. 67 and 68 will be provided to SERS under a separate report to provide required financial reporting data to SERS and participating employers of the system.

**State Employees' Retirement System**  
**Accounting Disclosure Statements (continued)**

**I. Schedule of Funding Progress as of December 31, 2014**

(Dollars in Thousands)

Note: This table is included in this report **FOR INFORMATION PURPOSES**; it is no longer a required disclosure under GASB.

Actuarial Valuation Date	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) (b)	Unfunded Actuarial Accrued Liability (UAAL) (b-a)	Funded Ratio (a) / (b)	Funding Payroll (c)	Unfunded Actuarial Accrued Liability as a Percentage of Funding Payroll ((b-a)/c)
12/31/1995*	15,510,309	15,067,205	(443,104)	102.9%	4,021,605	-11.0%
12/31/1996	16,841,069	15,936,616	(904,453)	105.7%	4,163,683	-21.7%
12/31/1997	18,565,136	17,288,413	(1,276,723)	107.4%	4,219,034	-30.3%
12/31/1998	20,670,711	18,357,899	(2,312,812)	112.6%	4,446,147	-52.0%
12/31/1999	23,624,267	19,091,840	(4,532,427)	123.7%	4,519,112	-100.3%
12/31/2000*	26,094,306	19,702,278	(6,392,028)	132.4%	4,769,180	-134.0%
12/31/2001	27,505,494	23,658,757	(3,846,737)	116.3%	4,872,375	-78.9%
12/31/2002	27,497,464	25,650,389	(1,847,075)	107.2%	5,093,454	-36.3%
12/31/2003	27,465,615	26,179,761	(1,285,854)	104.9%	4,965,360	-25.9%
12/31/2004	26,900,027	27,999,026	1,099,000	96.1%	5,093,573	21.6%
12/31/2005*	26,793,782	28,851,716	2,057,934	92.9%	5,138,377	40.1%
12/31/2006	28,148,834	30,364,997	2,216,163	92.7%	5,661,675	39.1%
12/31/2007	30,839,877	31,753,971	914,093	97.1%	5,529,069	16.5%
12/31/2008**	30,635,621	34,437,396	3,801,775	89.0%	5,660,319	67.2%
12/31/2009	30,204,693	35,797,017	5,592,324	84.4%	5,935,988	94.2%
12/31/2010*	29,443,945	39,179,594	9,735,649	75.2%	5,851,704	166.4%
12/31/2011***	27,618,461	42,281,862	14,663,401	65.3%	5,890,704	248.9%
12/31/2012	25,302,688	43,055,564	17,752,876	58.8%	5,836,402	304.2%
12/31/2013	25,975,185	43,874,580	17,899,395	59.2%	5,897,627	303.5%
12/31/2014	26,584,948	44,750,670	18,165,722	59.4%	6,021,688	301.7%

\* Revised economic and demographic assumptions due to experience review.

\*\* Revised interest rate assumption from 8.5% to 8.0%.

\*\*\* Revised interest rate assumption from 8.0% to 7.5%.

**State Employees' Retirement System**  
**Accounting Disclosure Statements (continued)**

**II. Schedule of Employer Contributions as of December 31, 2014**

(Dollars in Thousands)

Note: This table is included in this report **FOR INFORMATION PURPOSES**; it is no longer a required disclosure under GASB.

Calendar Year	Annual Required Contribution (ARC)	Actual Contribution	Percentage Contributed
1995	376,692	384,506	102.1%
1996	373,903	373,903	100.0%
1997	324,093	324,093	100.0%
1998	310,501	310,501	100.0%
1999	269,869	269,869	100.0%
2000	168,002	168,002	100.0%
2001	52,104	76,709	147.2%
2002	22,906	50,831	221.9%
2003	55,079	67,947	123.4%
2004	105,229	105,229	100.0%
2005	319,190	147,163	46.1%
2006	548,745	195,407	35.6%
2007	617,253	242,337	39.3%
2008	584,248	233,138	39.9%
2009	643,861	251,870	39.1%
2010	866,822	272,525	31.4%
2011	913,778	391,189	42.8%
2012	1,044,632	562,883	53.9%
2013	1,314,925	790,996	60.2%
2014	1,407,361	1,081,826	76.9%

**Notes Pertaining to Governmental Accounting Standards Board Statement No. 25 (Although Statement 25 has been replaced by Statement 67, the Statement 25 notes below and on the following pages are provided FOR INFORMATION PURPOSES.)**

The actual contribution amounts in the above table include the employer share of regular contributions, the employer share of purchased service and contributions for employee service under the Public School Employees' Retirement System.

The information presented above was determined as part of the actuarial valuations at the dates indicated. Additional information as of the latest actuarial funding valuation follows.

## State Employees' Retirement System

### Accounting Disclosure Statements (continued)

Valuation Date	December 31, 2014
Actuarial cost method	Variation of Entry-age Actuarial Cost Method
Amortization method	10-year or 30-year schedule with level payments (on a closed amortization basis)
Remaining amortization period	25 to 30 years (rounded equivalent single amortization period: 26 years)
Asset valuation method	5-year smoothed market
Actuarial Assumptions	
Investment rate of return	7.5 percent
Projected compensation increases	Average increase of 6.1 percent (range: 4.3 to 11.05 percent)
Inflation	2.75 percent
Cost-of-living adjustments	None

The annual employer contribution as set forth in the SERC is equal to the sum of the following:

- (1) The employer share of the normal cost.
- (2) The fresh start amortization of the December 31, 2009 unfunded liability over a 30-year period beginning July 1, 2010 and ending on June 30, 2040.
- (3) The amortization of the change in liability due to Act 2010-120 over a 30-year period beginning July 1, 2011 and ending on June 30, 2041.
- (4) The amortization of changes in liability due to actual experience differing from assumed experience after December 31, 2009 over 30-year periods beginning with the July 1<sup>st</sup> following the actuarial valuation determining such changes.

Valuations are performed on December 31 of each year and the results are presented to the Board as a basis for determining the employer contribution rate for the year beginning July 1 after the valuation date. The Board has adopted the rate from the valuation unless information available after or as part of the valuation supports an adjustment to the valuation rate.

Apart from the statutory funding requirements set forth in the SERC, there are separate accounting standards applicable to SERS. The current reporting requirements of GASB Statements No. 67 and 68 are provided under a separate report.

The former reporting requirements of GASB Statements No. 25 and 27 defined an Annual Required Contribution (ARC) for financial reporting purposes. As long as the statutory annual employer contribution, as defined above, was at least equal to the minimum contribution reported under GASB Statement No. 25, the statutory annual employer contribution was deemed to be the ARC. Whenever the statutory annual employer contribution was less than the minimum contribution reported under GASB, the GASB minimum was deemed to be the ARC.

## State Employees' Retirement System

### Accounting Disclosure Statements (continued)

GASB Statement No. 25 defined the ARC to be equal to the employer normal cost plus an amount to amortize the unfunded actuarial accrued liability. The Statement prescribed the maximum acceptable period over which the total unfunded actuarial liability should be amortized. The Statement also required that the "equivalent single amortization period" for all combined amortizations should not exceed the maximum acceptable period. Under the contribution collars from Act 2010-120, the current contribution level results in an "equivalent single amortization period" in excess of the maximum acceptable period and thus an actual contribution less than the ARC. In this case, the ARC is determined using a 30-year amortization period.

The Board adopted slightly different rates in 1993 and 1994 based on information available after the valuation was performed. In 1993, the valuation rate of 9.27 percent was lowered to 8.92 percent because it was determined that the covered compensation reported for the valuation was unusually high and that future covered compensation was expected to be relatively lower. In 1994, the valuation rate of 8.53 percent was increased to 8.92 percent to allow for the extension of the early retirement window and acceleration of the longevity pay scales.

The actuary agreed with the actions taken by the Board that resulted in some difference between the ARC and the actual contribution. The table presented on page 3 of Schedule H shows the ARC based on the actuarial valuation. The effect of the adjustments in 1993 and 1994 extended over three calendar years so the 1993 through 1995 actual contributions are different from the ARCs in those years.

The Board adopted the valuation rate as the contribution rate for 1996 through 2000.

During 2001, 2002, and 2003, actual contributions exceeded the ARC. For the period July 1, 2001 through June 30, 2003, the ARC was set at zero. However, contributions were made by employers of some special class members for the cost of additional benefits including payment of past liabilities for retroactive benefit enhancements. Collection of those amounts resulted in the actual contributions exceeding the ARC for all or part of calendar years 2001, 2002 and 2003.

All amortization payments are currently based upon a 30-year schedule of contributions which remain level during the amortization period. The employer cost is determined as a percent of covered compensation, and the employer contributes that percent of the compensation of all covered members during each fiscal year.

The employer contribution has been below the GASB Statement No. 25 minimum since July 1, 2005, and we anticipate that the employer contribution to SERS will be lower than the ARC through June 30, 2015. Thereafter, provided that employer contributions are made in accordance with current law, we expect actual employer contributions to exceed the GASB Statement No. 25 minimum.



**State Employees' Retirement System**  
**Solvency Test**

Valuation Date	Actuarial Accrued Liabilities For			Total Actuarial Liability (AAL)	Actuarial Value of Assets	Portion of Accrued Liabilities Covered by Reported Assets			Funded Ratio
	(1)	(2)	(3)			(1)	(2)	(3)	
	Active Participant Contributions	Annuitants and Beneficiaries	Active Participants (Employer Financed Portion)						
(Amounts in Thousands)									
December 31, 1992	\$ 1,994,567	\$ 4,621,318	\$ 4,872,529	\$ 11,488,414	\$ 11,769,388	100.0 %	100.0 %	100.0 %	102.4 %
December 31, 1993	2,170,593	4,806,907	5,236,236	12,213,736	13,060,613	100.0	100.0	100.0	106.9
December 31, 1994	2,352,731	5,039,221	6,350,104	13,742,056	13,991,485	100.0	100.0	100.0	101.8
December 31, 1995	2,499,485	5,649,454	6,918,265	15,067,205	15,510,309	100.0	100.0	100.0	102.9
December 31, 1996	2,646,630	6,027,333	7,262,653	15,936,616	16,841,069	100.0	100.0	100.0	105.7
December 31, 1997	2,748,177	6,951,411	7,588,825	17,288,413	18,565,136	100.0	100.0	100.0	107.4
December 31, 1998	2,904,232	7,200,000	8,253,666	18,357,899	20,670,711	100.0	100.0	100.0	112.6
December 31, 1999	2,989,489	7,779,993	8,322,358	19,091,840	23,624,267	100.0	100.0	100.0	123.7
December 31, 2000	3,182,776	8,148,876	8,370,626	19,702,278	26,094,306	100.0	100.0	100.0	132.4
December 31, 2001	3,344,107	8,684,734	11,629,915	23,658,757	27,505,494	100.0	100.0	100.0	116.3
December 31, 2002	3,498,672	10,129,669	12,022,048	25,650,389	27,497,464	100.0	100.0	100.0	107.2
December 31, 2003	3,588,664	11,296,520	11,294,578	26,179,761	27,465,615	100.0	100.0	100.0	104.9
December 31, 2004	3,593,576	12,779,570	11,625,880	27,999,026	26,900,027	100.0	100.0	90.5	96.1
December 31, 2005	3,696,477	14,000,196	11,155,043	28,851,716	26,793,782	100.0	100.0	81.6	92.9
December 31, 2006	3,916,841	14,474,525	11,973,631	30,364,997	28,148,834	100.0	100.0	81.5	92.7
December 31, 2007	3,849,293	16,255,843	11,648,835	31,753,971	30,839,877	100.0	100.0	92.2	97.1
December 31, 2008	4,068,036	17,305,971	13,063,389	34,437,396	30,635,621	100.0	100.0	70.9	89.0
December 31, 2009	4,280,680	17,962,741	13,553,596	35,797,017	30,204,693	100.0	100.0	58.7	84.4
December 31, 2010	4,409,444	18,995,355	15,774,795	39,179,594	29,443,945	100.0	100.0	38.3	75.2
December 31, 2011	4,406,306	21,222,075	16,653,481	42,281,862	27,618,461	100.0	100.0	11.9	65.3
December 31, 2012	4,551,507	22,095,052	16,409,005	43,055,564	25,302,688	100.0	93.9	0.0	58.8
December 31, 2013	4,636,219	23,046,717	16,191,644	43,874,580	25,975,185	100.0	92.6	0.0	59.2
December 31, 2014	4,733,833	23,872,658	16,144,179	44,750,670	26,584,948	100.0	91.5	0.0	59.4

**State Employees' Retirement System**  
**Actuarial Value of Assets**

I. Development of 12/31/14 Expected Actuarial Value:	
A) Actuarial Value as of 12/31/13	\$ 25,975,185,060
B) Contributions in 2014	1,447,748,308
C) Benefits and Expenses in 2014	(2,967,128,943)
D) Investment return at 7.5% to 12/31/14 on (A)	1,948,138,880
E) Investment return at 7.5% to 12/31/14 on (B) and (C): 7.5% x .5 x ((B) + (C))	<u>(56,976,774)</u>
F) Expected Actuarial Value as of 12/31/14: (A) + (B) + (C) + (D) + (E)	\$ 26,346,966,531
II. Previous Differences Not Yet Amortized:	
A) Unrecognized amount of 12/31/10 Difference: .2 x \$734,085,211	\$ 146,817,042
B) Unrecognized amount of 12/31/11 Difference: .4 x (\$1,795,550,551)	(718,220,220)
C) Unrecognized amount of 12/31/12 Difference: .6 x \$789,653,676	473,792,206
D) Unrecognized amount of 12/31/13 Difference: .8 x \$1,890,838,336	<u>1,512,670,669</u>
E) Total	\$ 1,415,059,697
III. Gain or Loss from 2014	
A) Market Value of Assets on 12/31/14	\$ 27,332,909,054
B) Expected Market Value II(E) + I(F)	<u>27,762,026,228</u>
C) Gain (loss) from 2014 Investments (A) - (B)	\$ (429,117,174)
IV. Development of Actuarial Value of Assets as of 12/31/14:	
A) 20% of \$734,085,211 (12/31/10 Difference):	\$ 146,817,042
B) 20% of (\$1,795,550,551) (12/31/11 Difference):	(359,110,110)
C) 20% of \$789,653,676 (12/31/12 Difference):	157,930,735
D) 20% of \$1,890,838,336 (12/31/13 Difference):	378,167,667
E) 20% of (\$429,117,174) (12/31/14 Difference):	<u>(85,823,435)</u>
F) Total Difference: (A) + (B) + (C) + (D) + (E)	\$ 237,981,899
G) Actuarial Value at 12/31/14: I(F) + IV(F)	\$ 26,584,948,430

**State Employees' Retirement System**  
**Projection of Population, Benefits, and Contributions**

**Projection of Annuitants, Beneficiaries and Active Participants**  
**Actual Data Through 2014**

Calendar Year	New Annuitants During the Year	Annuitant Deaths During the Year	Total Annuitants (End of Year)	New Beneficiaries During the Year	Beneficiary Deaths During the Year	Total Beneficiaries (End of Year)	Total Annuitants and Beneficiaries	Active Participants
1996			75,609			7,477	83,086	110,922
1997			77,667			7,790	85,457	108,684
1998			78,017			7,817	85,834	108,893
1999			80,095			7,948	88,043	108,035
2000			80,289			8,103	88,392	109,469
2001			80,911			8,306	89,217	109,716
2002			82,805			8,423	91,228	111,059
2003			85,808			8,604	94,412	109,018
2004			89,869			8,858	98,727	108,405
2005			92,120			9,059	101,179	109,981
2006			92,879			9,181	102,060	110,972
2007			97,657			9,473	107,130	109,610
2008			98,492			9,654	108,146	110,866
2009			99,776			9,863	109,639	110,107
2010			101,701			10,012	111,713	109,255
2011			105,096			10,246	115,342	107,021
2012			106,673			10,388	117,061	106,048
2013			109,356			10,696	120,052	105,186
2014			111,328			10,921	122,249	104,431
2015	5,204	3,456	113,076	691	548	11,064	124,140	104,431
2016	5,172	3,515	114,733	703	596	11,171	125,904	104,431
2017	5,183	3,562	116,354	712	637	11,246	127,600	104,431
2018	5,004	3,605	117,753	721	672	11,295	129,048	104,431
2019	4,869	3,643	118,979	729	700	11,324	130,303	104,431
2020	4,692	3,693	119,978	739	724	11,339	131,317	104,431
2021	4,489	3,731	120,736	746	741	11,344	132,080	104,431
2022	4,312	3,774	121,274	755	754	11,345	132,619	104,431
2023	4,119	3,823	121,570	765	764	11,346	132,916	104,431
2024	3,929	3,873	121,626	775	772	11,349	132,975	104,431
2025	3,721	3,938	121,409	788	781	11,356	132,765	104,431

The retirement projections in Schedule K are based upon the current retirement assumptions used for the valuation.

**State Employees' Retirement System**  
**Projection of Population, Benefits, and Contributions**

**Projection of Expected Contributions and Benefits - Reflecting Act 120 Collars**  
**Actual Data Through 2014 (Dollars in Millions)**

Year	Contributions as a Percent of Pay						Calendar Year Benefits and Expenses
	Calendar Year Contributions (After 2014, Based Upon Blended Fiscal Projections)		Calendar Year Contributions ( Employer Rates Based Upon Blended Fiscal Projections)		Actual Projected Employer Rate (Fiscal Year Beginning July 1)		
	Employee	Employer	Employee	Employer	Employee	Employer	
1996	\$ 210	\$ 374					\$ 943
1997	213	324					1,037
1998	222	311					1,080
1999	224	270					1,248
2000	232	168					1,198
2001	240	77					1,266
2002	304	51					1,450
2003	308	68					1,656
2004	302	106					1,880
2005	306	147					1,966
2006	317	196					1,943
2007	334	242					2,361
2008	337	233					2,231
2009	349	252					2,297
2010	349	273					2,473
2011	351	391					2,730
2012	348	563					2,690
2013	352	791					2,862
2014	366	1,082					2,967
2015	372	1,356	6.4%	22.8%	25.0%		3,075
2016	381	1,666	6.4%	27.3%	29.5%		3,203
2017	393	1,887	6.4%	30.0%	30.4%		3,335
2018	405	1,941	6.4%	29.9%	29.4%		3,458
2019	417	1,947	6.4%	29.1%	28.8%		3,583
2020	430	1,964	6.4%	28.5%	28.2%		3,704
2021	443	1,978	6.4%	27.8%	27.5%		3,818
2022	457	1,993	6.4%	27.2%	26.9%		3,932
2023	471	2,009	6.4%	26.6%	26.3%		4,042
2024	485	2,026	6.4%	26.1%	25.8%		4,148
2025	500	2,043	6.4%	25.5%	25.2%		4,251

This projection is based upon these assumptions: a projected investment return of 7.5 percent in 2015 and after; general pay increases of 3.05 percent; no future COLAs. The employer contributions are subject to the Act 2010-120 collars, which are projected to be applicable through 2016, after which actuarially determined employer contribution rates apply.

**State Employees' Retirement System**  
**Projection of Population, Benefits, and Contributions**

**Projection of Expected Contributions and Benefits - Without Future Act 120 Collars**  
**Actual Data Through 2014 (Dollars in Millions)**

Year	Calendar Year Contributions (After 2014, Based Upon Blended Fiscal Projections)		Contributions as a Percent of Pay			Calendar Year Benefits and Expenses
	Employee	Employer	Calendar Year Contributions ( Employer Rates Based Upon Blended Fiscal Projections)		Actual Projected Employer Rate (Fiscal Year Beginning July 1)	
			Employee	Employer		
1996	\$ 210	\$ 374				\$ 943
1997	213	324				1,037
1998	222	311				1,080
1999	224	270				1,248
2000	232	168				1,198
2001	240	77				1,266
2002	304	51				1,450
2003	308	68				1,656
2004	302	106				1,880
2005	306	147				1,966
2006	317	196				1,943
2007	334	242				2,361
2008	337	233				2,231
2009	349	252				2,297
2010	349	273				2,473
2011	351	391				2,730
2012	348	563				2,690
2013	352	791				2,862
2014	366	1,082				2,967
2015	372	1,550	6.4%	26.0%	31.5%	3,075
2016	381	1,914	6.4%	31.3%	31.1%	3,203
2017	393	1,918	6.4%	30.4%	29.8%	3,335
2018	405	1,899	6.4%	29.2%	28.7%	3,458
2019	417	1,902	6.4%	28.4%	28.2%	3,583
2020	430	1,919	6.4%	27.8%	27.5%	3,704
2021	443	1,932	6.4%	27.2%	26.9%	3,818
2022	457	1,948	6.4%	26.6%	26.3%	3,932
2023	471	1,964	6.4%	26.0%	25.7%	4,042
2024	485	1,981	6.4%	25.5%	25.2%	4,148
2025	500	1,998	6.4%	24.9%	24.7%	4,251

This projection is based upon these assumptions: a projected investment return of 7.5 percent in 2015 and after; general pay increases of 3.05 percent; no future COLAs. No Act 2010-120 employer contribution collars are assumed after June 30, 2015 in this projection, therefore actuarially determined employer contribution rates apply effective July 1, 2015.

**State Employees' Retirement System**  
**I. Age, Service and Salary Profile of Active Participants as of December 31, 2014**

**Active Participants\***

Males - Full Years of Service to December 31, 2014

Age Group	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30+	Total	Average Salary
Less than 20	27	0	0	0	0	0	0	27	\$ 25,405
20-24	860	2	0	0	0	0	0	862	30,300
25-29	2,157	505	9	0	0	0	0	2,671	38,536
30-34	1,671	1,450	449	5	0	0	0	3,575	44,643
35-39	1,302	1,223	1,074	239	5	0	0	3,843	49,503
40-44	1,251	1,111	1,039	852	330	14	0	4,597	53,523
45-49	1,182	1,048	999	849	1,019	461	11	5,569	55,574
50-54	1,240	1,084	1,050	767	935	1,260	560	6,896	57,700
55-59	1,086	1,073	1,070	821	894	1,109	1,149	7,202	58,519
60-64	778	839	846	616	479	449	593	4,600	57,815
65+	<u>417</u>	<u>464</u>	<u>429</u>	<u>288</u>	<u>168</u>	<u>120</u>	<u>265</u>	<u>2,151</u>	57,822
<b>Total</b>	11,971	8,799	6,965	4,437	3,830	3,413	2,578	41,993	\$ 53,456

Average Age 47.74  
Average Service 11.95

Females - Full Years of Service to December 31, 2014

Age Group	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30+	Total	Average Salary
Less than 20	35	0	0	0	0	0	0	35	\$ 23,138
20-24	1,000	20	0	0	0	0	0	1,020	28,208
25-29	2,101	514	11	0	0	0	0	2,626	35,596
30-34	1,710	1,399	489	19	0	0	0	3,617	41,218
35-39	1,403	1,223	1,076	324	21	0	0	4,047	45,491
40-44	1,269	1,194	979	697	441	44	0	4,624	47,352
45-49	1,279	1,240	1,028	702	810	619	40	5,718	49,042
50-54	1,246	1,317	1,146	768	833	914	780	7,004	50,644
55-59	1,067	1,196	1,190	802	942	841	1,051	7,089	51,221
60-64	542	806	796	622	428	378	470	4,042	50,658
65+	<u>190</u>	<u>295</u>	<u>281</u>	<u>199</u>	<u>101</u>	<u>86</u>	<u>152</u>	<u>1,304</u>	49,409
<b>Total</b>	11,842	9,204	6,996	4,133	3,576	2,882	2,493	41,126	\$ 47,236

Average Age 46.96  
Average Service 11.55

\* The following three pages contain information on members in special categories. These include selected hazardous duty members, legislators, judges and district justices. The above information is for all other active members. Page five of Schedule L is the total of all active categories. Page six is the total of all active participants and inactive and vested participants.

**State Employees' Retirement System**  
**I. Age, Service and Salary Profile of Active Participants as of December 31, 2014**

**Selected Hazardous Duty\***

Males - Full Years of Service to December 31, 2014

Age Group	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30+	Total	Average Salary
Less than 20	0	0	0	0	0	0	0	0	\$ -
20-24	206	0	0	0	0	0	0	206	38,959
25-29	1,190	184	2	0	0	0	0	1,376	49,650
30-34	773	1,166	172	3	0	0	0	2,114	60,945
35-39	388	869	711	215	4	0	0	2,187	66,194
40-44	299	548	746	1,005	472	10	0	3,080	74,234
45-49	184	419	512	841	1,502	372	4	3,834	80,483
50-54	152	229	356	371	580	353	68	2,109	76,428
55-59	88	148	190	238	179	133	80	1,056	72,085
60-64	37	96	137	146	104	48	34	602	69,845
65+	<u>9</u>	<u>35</u>	<u>55</u>	<u>59</u>	<u>26</u>	<u>13</u>	<u>13</u>	<u>210</u>	69,959
<b>Total</b>	<b>3,326</b>	<b>3,694</b>	<b>2,881</b>	<b>2,878</b>	<b>2,867</b>	<b>929</b>	<b>199</b>	<b>16,774</b>	<b>\$ 70,419</b>

Average Age 43.00  
Average Service 12.51

Females - Full Years of Service to December 31, 2014

Age Group	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30+	Total	Average Salary
Less than 20	0	0	0	0	0	0	0	0	\$ -
20-24	38	0	0	0	0	0	0	38	37,963
25-29	197	45	0	0	0	0	0	242	47,939
30-34	168	227	26	1	0	0	0	422	54,361
35-39	119	213	147	29	1	0	0	509	58,541
40-44	81	186	147	122	30	1	0	567	62,192
45-49	76	132	100	124	98	18	0	548	64,801
50-54	62	128	83	86	62	35	7	463	64,173
55-59	22	77	77	51	46	25	12	310	66,516
60-64	16	42	39	45	24	3	7	176	64,160
65+	<u>0</u>	<u>6</u>	<u>8</u>	<u>8</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>37</u>	76,563
<b>Total</b>	<b>779</b>	<b>1,056</b>	<b>627</b>	<b>466</b>	<b>265</b>	<b>87</b>	<b>32</b>	<b>3,312</b>	<b>\$ 60,692</b>

Average Age 43.60  
Average Service 9.99

\* Enforcement officers, correction officers, psychiatric security aides, and officers of the Pennsylvania State Police and the Delaware River Port Authority

**State Employees' Retirement System**

**I. Age, Service and Salary Profile of Active Participants as of December 31, 2014**

**Legislators\***

Males - Full Years of Service to December 31, 2014

Age Group	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30+	Total	Average Salary
Less than 20	0	0	0	0	0	0	0	0	\$ -
20-24	0	0	0	0	0	0	0	0	-
25-29	1	0	0	0	0	0	0	1	85,339
30-34	7	5	0	0	0	0	0	12	85,339
35-39	5	3	3	1	0	0	0	12	88,531
40-44	5	5	3	1	0	0	0	14	87,415
45-49	5	9	4	2	1	0	0	21	88,646
50-54	8	5	6	5	5	0	0	29	90,729
55-59	6	10	5	6	4	2	5	38	91,490
60-64	1	3	6	5	5	1	4	25	89,035
65+	<u>3</u>	<u>7</u>	<u>1</u>	<u>2</u>	<u>4</u>	<u>4</u>	<u>8</u>	<u>29</u>	88,925
<b>Total</b>	<b>41</b>	<b>47</b>	<b>28</b>	<b>22</b>	<b>19</b>	<b>7</b>	<b>17</b>	<b>181</b>	<b>\$ 89,335</b>

Average Age 53.32  
Average Service 12.84

Females - Full Years of Service to December 31, 2014

Age Group	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30+	Total	Average Salary
Less than 20	0	0	0	0	0	0	0	0	\$ -
20-24	0	0	0	0	0	0	0	0	-
25-29	0	0	0	0	0	0	0	0	-
30-34	0	0	0	0	0	0	0	0	-
35-39	1	0	0	0	0	0	0	1	85,339
40-44	3	1	0	0	0	0	0	4	85,339
45-49	0	2	0	0	1	1	0	4	88,332
50-54	2	2	0	0	2	1	0	7	88,419
55-59	5	1	1	0	0	0	1	8	85,339
60-64	1	1	1	1	0	3	0	7	87,928
65+	<u>1</u>	<u>1</u>	<u>2</u>	<u>0</u>	<u>5</u>	<u>1</u>	<u>0</u>	<u>10</u>	86,536
<b>Total</b>	<b>13</b>	<b>8</b>	<b>4</b>	<b>1</b>	<b>8</b>	<b>6</b>	<b>1</b>	<b>41</b>	<b>\$ 86,891</b>

Average Age 57.61  
Average Service 12.90

\*Legislators are not required to join the retirement system, therefore the total participant count may not add to 253.



**State Employees' Retirement System**  
**I. Age, Service and Salary Profile of Active Participants as of December 31, 2014**

**Judges And Magisterial District Judges**

Males - Full Years of Service to December 31, 2014

Age Group	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30+	Total	Average Salary
Less than 20	0	0	0	0	0	0	0	0	\$ -
20-24	0	0	0	0	0	0	0	0	-
25-29	0	0	0	0	0	0	0	0	-
30-34	2	0	0	0	0	0	0	2	87,154
35-39	8	3	1	1	0	0	0	13	93,720
40-44	12	9	3	1	0	0	0	25	116,669
45-49	30	28	8	8	1	0	0	75	119,437
50-54	30	26	18	14	6	3	0	97	116,354
55-59	25	45	24	32	17	10	1	154	127,469
60-64	20	44	29	32	46	25	9	205	126,999
65+	<u>8</u>	<u>18</u>	<u>21</u>	<u>34</u>	<u>29</u>	<u>25</u>	<u>16</u>	<u>151</u>	144,311
<b>Total</b>	135	173	104	122	99	63	26	722	\$ 127,437

Average Age 57.91  
Average Service 13.27

Females - Full Years of Service to December 31, 2014

Age Group	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30+	Total	Average Salary
Less than 20	0	0	0	0	0	0	0	0	\$ -
20-24	0	0	0	0	0	0	0	0	-
25-29	0	0	0	0	0	0	0	0	-
30-34	3	0	0	0	0	0	0	3	86,914
35-39	2	2	0	0	0	0	0	4	86,914
40-44	7	8	5	2	0	0	0	22	114,702
45-49	17	9	7	6	3	0	0	42	124,123
50-54	5	26	7	5	4	1	0	48	130,585
55-59	6	23	13	17	6	3	0	68	144,542
60-64	2	10	9	14	14	9	6	64	145,864
65+	<u>1</u>	<u>3</u>	<u>4</u>	<u>8</u>	<u>5</u>	<u>7</u>	<u>3</u>	<u>31</u>	144,725
<b>Total</b>	43	81	45	52	32	20	9	282	\$ 135,687

Average Age 55.18  
Average Service 12.73

**State Employees' Retirement System**  
**I. Age, Service and Salary Profile of Active Participants as of December 31, 2014**

**All Active Participants**

Males - Full Years of Service to December 31, 2014

Age Group	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30+	Total	Average Salary
Less than 20	27	0	0	0	0	0	0	27	\$ 25,405
20-24	1,066	2	0	0	0	0	0	1,068	31,970
25-29	3,348	689	11	0	0	0	0	4,048	42,325
30-34	2,453	2,621	621	8	0	0	0	5,703	50,786
35-39	1,703	2,098	1,789	456	9	0	0	6,055	55,704
40-44	1,567	1,673	1,791	1,859	802	24	0	7,716	62,056
45-49	1,401	1,504	1,523	1,700	2,523	833	15	9,499	66,205
50-54	1,430	1,344	1,430	1,157	1,526	1,616	628	9,131	62,753
55-59	1,205	1,276	1,289	1,097	1,094	1,254	1,235	8,450	61,619
60-64	836	982	1,018	799	634	523	640	5,432	61,903
65+	<u>437</u>	<u>524</u>	<u>506</u>	<u>383</u>	<u>227</u>	<u>162</u>	<u>302</u>	<u>2,541</u>	64,320
Total	15,473	12,713	9,978	7,459	6,815	4,412	2,820	59,670	\$ 59,228

Average Age 46.55  
Average Service 12.12

Females - Full Years of Service to December 31, 2014

Age Group	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30+	Total	Average Salary
Less than 20	35	0	0	0	0	0	0	35	\$ 23,138
20-24	1,038	20	0	0	0	0	0	1,058	28,559
25-29	2,298	559	11	0	0	0	0	2,868	36,638
30-34	1,881	1,626	515	20	0	0	0	4,042	42,624
35-39	1,525	1,438	1,223	353	22	0	0	4,561	46,993
40-44	1,360	1,389	1,131	821	471	45	0	5,217	49,278
45-49	1,372	1,383	1,135	832	912	638	40	6,312	50,934
50-54	1,315	1,473	1,236	859	901	951	787	7,522	52,022
55-59	1,100	1,297	1,281	870	994	869	1,064	7,475	52,741
60-64	561	859	845	682	466	393	483	4,289	52,694
65+	<u>192</u>	<u>305</u>	<u>295</u>	<u>215</u>	<u>115</u>	<u>99</u>	<u>161</u>	<u>1,382</u>	52,543
Total	12,677	10,349	7,672	4,652	3,881	2,995	2,535	44,761	\$ 48,825

Average Age 46.77  
Average Service 11.44

**State Employees' Retirement System**

**II. Age and Service Profile of Active Participants and Inactive and Vested Participants**

**As of December 31, 2014**

**Active Participants and Inactive and Vested Participants**

Males - Full Years of Service to December 31, 2014

Age Group	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30+	Total
Less than 20	27	0	0	0	0	0	0	27
20-24	1,068	2	0	0	0	0	0	1,070
25-29	3,358	722	11	0	0	0	0	4,091
30-34	2,472	2,794	641	8	0	0	0	5,915
35-39	1,726	2,298	1,848	460	9	0	0	6,341
40-44	1,590	1,908	1,881	1,888	805	27	0	8,099
45-49	1,438	1,725	1,652	1,753	2,546	851	16	9,981
50-54	1,475	1,538	1,556	1,228	1,562	1,646	640	9,645
55-59	1,264	1,437	1,413	1,161	1,145	1,295	1,282	8,997
60-64	897	1,060	1,086	836	693	571	704	5,847
65+	<u>550</u>	<u>576</u>	<u>550</u>	<u>411</u>	<u>255</u>	<u>177</u>	<u>328</u>	<u>2,847</u>
Total	15,865	14,060	10,638	7,745	7,015	4,567	2,970	62,860

Average Age 46.77

Average Service 12.07

Females - Full Years of Service to December 31, 2014

Age Group	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30+	Total
Less than 20	35	0	0	0	0	0	0	35
20-24	1,038	21	0	0	0	0	0	1,059
25-29	2,303	604	11	0	0	0	0	2,918
30-34	1,905	1,807	528	20	0	0	0	4,260
35-39	1,555	1,711	1,291	357	22	0	0	4,936
40-44	1,422	1,669	1,217	849	474	47	0	5,678
45-49	1,443	1,630	1,256	887	923	648	40	6,827
50-54	1,418	1,750	1,406	917	931	969	806	8,197
55-59	1,215	1,560	1,486	941	1,028	898	1,102	8,230
60-64	717	998	942	727	535	424	528	4,871
65+	<u>280</u>	<u>353</u>	<u>335</u>	<u>229</u>	<u>141</u>	<u>106</u>	<u>170</u>	<u>1,614</u>
Total	13,331	12,103	8,472	4,927	4,054	3,092	2,646	48,625

Average Age 47.08

Average Service 11.29

**State Employees' Retirement System**  
**III. Age and Benefit Profile of Annuitants and Beneficiaries as of December 31, 2014**

**Superannuation Annuitants**

Age	Male		Female		Total	
	Number	Annual Annuity	Number	Annual Annuity	Number	Annual Annuity
Under 25	-	\$ -	-	\$ -	-	\$ -
25-29	-	-	-	-	-	-
30-34	-	-	-	-	-	-
35-39	-	-	-	-	-	-
40-44	-	-	-	-	-	-
45-49	-	-	-	-	-	-
50-54	593	23,241,650	148	4,892,669	741	28,134,319
55-59	1,577	63,800,950	976	39,159,123	2,553	102,960,073
60-64	5,064	176,025,919	4,179	136,909,268	9,243	312,935,187
65-69	9,091	287,070,962	5,558	146,044,145	14,649	433,115,107
70-74	6,586	201,521,934	4,302	96,114,036	10,888	297,635,970
75-79	4,825	130,780,116	3,381	60,734,124	8,206	191,514,240
80-84	3,405	77,733,275	2,721	37,032,762	6,126	114,766,037
85-89	2,364	45,327,656	2,281	25,815,358	4,645	71,143,014
90 & over	1,314	22,423,285	1,863	16,970,671	3,177	39,393,956
Total	34,819	\$ 1,027,925,747	25,409	\$ 563,672,156	60,228	\$ 1,591,597,903

Average Age 72.4  
Average Annual Annuity \$26,426

**State Employees' Retirement System**  
**III. Age and Benefit Profile of Annuitants and Beneficiaries as of December 31, 2014**

**Early Retirement Annuitants**

<u>Age</u>	<u>Male</u>		<u>Female</u>		<u>Total</u>	
	<u>Number</u>	<u>Annual Annuity</u>	<u>Number</u>	<u>Annual Annuity</u>	<u>Number</u>	<u>Annual Annuity</u>
Under 25	-	\$ -	-	\$ -	-	\$ -
25-29	21	15,997	56	36,295	77	52,292
30-34	191	220,290	256	221,442	447	441,732
35-39	379	592,778	446	562,736	825	1,155,514
40-44	627	2,532,517	641	1,387,094	1,268	3,919,611
45-49	1,209	25,418,798	860	3,847,661	2,069	29,266,459
50-54	1,700	42,126,278	1,401	13,369,257	3,101	55,495,535
55-59	2,287	48,226,571	2,710	38,838,448	4,997	87,065,019
60-64	3,765	85,221,563	4,974	86,454,457	8,739	171,676,020
65-69	5,314	122,689,558	4,110	66,299,583	9,424	188,989,141
70-74	3,202	63,529,121	2,052	27,459,460	5,254	90,988,581
75-79	1,621	24,902,991	1,373	14,222,725	2,994	39,125,716
80-84	1,116	16,772,306	1,028	9,585,955	2,144	26,358,261
85-89	443	6,432,818	538	4,355,861	981	10,788,679
90 & over	122	1,748,528	241	1,814,797	363	3,563,325
<b>Total</b>	<b>21,997</b>	<b>\$ 440,430,114</b>	<b>20,686</b>	<b>\$ 268,455,771</b>	<b>42,683</b>	<b>\$ 708,885,885</b>

Average Age 63.7  
Average Annual Annuity \$16,608

**State Employees' Retirement System**  
**III. Age and Benefit Profile of Annuitants and Beneficiaries as of December 31, 2014**

**Disabled Annuitants**

Age	Male		Female		Total	
	Number	Annual Annuity	Number	Annual Annuity	Number	Annual Annuity
Under 25	-	\$ -	-	\$ -	-	\$ -
25-29	2	23,933	1	9,939	3	33,872
30-34	12	156,834	14	158,109	26	314,943
35-39	35	494,303	44	588,142	79	1,082,445
40-44	118	1,803,333	108	1,360,553	226	3,163,886
45-49	240	4,256,335	207	3,067,352	447	7,323,687
50-54	435	7,934,626	447	7,164,379	882	15,099,005
55-59	689	13,112,434	727	12,449,481	1,416	25,561,915
60-64	880	14,972,933	992	15,734,746	1,872	30,707,679
65-69	773	11,446,046	810	11,348,800	1,583	22,794,846
70-74	447	5,097,460	458	4,902,547	905	10,000,007
75-79	210	1,919,019	287	2,572,670	497	4,491,689
80-84	113	1,008,682	171	1,332,579	284	2,341,261
85-89	68	645,801	84	634,965	152	1,280,766
90 & over	11	93,262	34	253,711	45	346,973
Total	4,033	\$ 62,965,001	4,384	\$ 61,577,973	8,417	\$ 124,542,974

Average Age 62.7  
Average Annual Annuity \$14,797

**State Employees' Retirement System**  
**III. Age and Benefit Profile of Annuitants and Beneficiaries as of December 31, 2014**

**Beneficiaries and Survivor Annuitants**

<u>Age</u>	<u>Male</u>		<u>Female</u>		<u>Total</u>	
	<u>Number</u>	<u>Annual Annuity</u>	<u>Number</u>	<u>Annual Annuity</u>	<u>Number</u>	<u>Annual Annuity</u>
Under 25	15	\$ 134,146	18	\$ 120,826	33	\$ 254,972
25-29	17	174,942	17	90,827	34	265,769
30-34	7	145,202	16	140,365	23	285,567
35-39	24	374,513	27	432,763	51	807,276
40-44	28	315,573	52	420,334	80	735,907
45-49	49	554,373	123	1,249,693	172	1,804,066
50-54	44	283,266	290	3,146,736	334	3,430,002
55-59	84	665,311	488	6,117,602	572	6,782,913
60-64	146	1,634,845	831	11,208,774	977	12,843,619
65-69	188	2,225,646	1,230	17,901,613	1,418	20,127,259
70-74	168	1,775,288	1,220	18,239,551	1,388	20,014,839
75-79	138	1,333,862	1,324	16,937,264	1,462	18,271,126
80-84	127	1,213,833	1,428	15,921,542	1,555	17,135,375
85-89	103	939,093	1,431	13,592,421	1,534	14,531,514
90 & over	64	572,453	1,224	9,378,279	1,288	9,950,732
Total	1,202	\$ 12,342,346	9,719	\$ 114,898,590	10,921	\$ 127,240,936

Average Age 74.6  
Average Annual Annuity \$11,651

## State Employees' Retirement System

### **Benefit and Contribution Provisions as of December 31, 2014** **(as embodied in Act 31 of 1974, and amended through Act 181 in October 2012)**

The State Employees' Retirement System makes provision for retirement, disability, and death benefits for all State employees, except those specifically excluded under Section 5301 of the SERC, and certain other eligible groups. The major provisions are summarized as follows:

#### **Eligible Employees**

- Class A-3 - All eligible employees hired after December 31, 2010, except members of the judiciary. Certain groups have effective dates after December 31, 2010 that are tied to the expiration of collective bargaining agreements. Members of the General Assembly who joined SERS on or after December 1, 2010 are also part of this class.
- Class A-4 - Same as Class A-3 except that this class is for members who elect to pay a higher member contribution amount and receive a higher benefit.
- Class AA - All eligible employees hired after June 30, 2001 but prior to January 1, 2011, except State Police Officers, members of the judiciary and legislators, and employees hired before July 1, 2001, who elected Class AA by December 31, 2001.
- Class A - State Police Officers hired on or after March 1, 1974 but prior to July 1, 2012, members of the judiciary who have not elected Class E-1 or E-2, legislators elected and became members before July 1, 2001, who have not elected Class AA or Class D-4 and Class A employees hired before July 1, 2001, who remained in Class A.
- Class D-4 - Legislators coming into service after June 30, 2001 but prior to December 1, 2010, who elect to be SERS members, and legislators who elected Class D-4 before July 1, 2001.
- Class E-1 - Judges who elect Class E-1.
- Class E-2 - Magisterial District Judges who elect Class E-2.



## State Employees' Retirement System

### **Benefit and Contribution Provisions as of December 31, 2014 (continued)** **(as embodied in Act 31 of 1974, and amended through Act 181 in October 2012)**

#### **Age and Service Requirements for Superannuation (full formula benefits)**

##### Class A-3 & Class A-4

General Conditions	Age 65 with three years of credited state service; or a total attained age and years of credited service of 92 (the "Rule of 92") with credited service being at least 35 years.
Legislators and certain correction officers and enforcement officers	Age 55 with three years of credited state service.
Park Rangers & Capitol Police	Age 55 with 20 years of Park Ranger or Capitol Police credited service. If total credited service is less than 20 years, General Conditions apply.
State Police	Age 55. State Police are eligible for special unreduced benefits after 20 years of credited service, regardless of age; however, age 55 remains their superannuation age.

##### Class AA & Class A

General Conditions	Age 60 with three years of credited state service; or 35 or more years of credited service, regardless of age.
Legislators and certain correction officers and enforcement officers	Age 50 with three years of credited state service.
Park Rangers & Capitol Police	Age 50 with 20 years of Park Ranger or Capitol Police credited service. If total credited service is less than 20 years, General Conditions apply.
State Police	Age 50. State Police are eligible for special unreduced benefits after 20 years of credited service, regardless of age; however, age 50 remains their superannuation age.

##### Class D-4

Age 50 with three years of credited state service.

##### Class E-1 & Class E-2

Age 60 with three years of credited state service; or 35 or more years of credited service, regardless of age.

## State Employees' Retirement System

### **Benefit and Contribution Provisions as of December 31, 2014 (continued)** **(as embodied in Act 31 of 1974, and amended through Act 181 in October 2012)**

#### **Formula for Superannuation Annuity**

The single life annuity applicable to members of Class AA and Class A-4 is equal to 2.5 percent of the high 3-year final average salary (FAS) of the member multiplied by the years and fractions of credited service.

The single life annuity applicable to members of Class A and Class A-3 is equal to 2 percent of the high 3-year final average salary of the member multiplied by the years and fractions of credited service.

The single life annuity applicable to Class A State Police is 50 percent of the highest full calendar year of compensation, other than the year in which the member retires, if the member has 20 but less than 25 years of service. With more than 25 years of service the benefit is 75 percent of the highest annual salary, other than the year in which the member retires.

The benefit accrual rates for other classes of members are as follows:

<u>Class</u>	<u>Benefit Accrual Rate</u>
D-4	3.0 percent
E-1	4.0 percent for each of the first 10 years of judicial service, dropping to 3.0 percent for each subsequent year of judicial service.
E-2	3.0 percent for each year of judicial service.

Members who have 41 or more years of combined Class A-3, A-4, A and AA service are entitled to a supplemental benefit ranging from 2 percent of the applicable single life annuity for members with 41 years of service to 10 percent of the applicable single life annuity for members with 45 or more years of service.

The benefit for a member who works past age 70 is at least equal to a benefit that is the actuarial equivalent of the prior year's benefit. This determination is made each year after age 70.

In addition to the above benefits, a member who has elected Social Security Integration Coverage is entitled to a single life annuity of 2 percent of the member's "Average Non-Covered Salary" for each year of Social Security Integration (SSI) coverage. All Class E members can elect SSI coverage. Other members must have elected SSI coverage before March, 1974. "Average Non-Covered Salary" is the average annual salary received while covered by the Retirement System since January 1, 1956 in excess of the maximum covered wages under Social Security.

## State Employees' Retirement System

### **Benefit and Contribution Provisions as of December 31, 2014 (continued)** **(as embodied in Act 31 of 1974, and amended through Act 181 in October 2012)**

#### **Limitations on Annuity**

In almost all cases, SERS benefits are limited to no more than 100 percent of compensation. An exception to this limit is the actuarial increase portion of the benefit for certain members eligible for actuarial increases due to retirement beyond age 70. For such members, the 100 percent of salary limit only applies to the base benefit. Also, the amount of annual retirement benefit a member may receive shall not exceed the dollar limit specified under Section 415(b) of the Internal Revenue Code. Benefits in excess of the 415(b) limit are paid through the Benefits Completion Plan.

#### **Age and Service Requirements for Disability Retirement**

A member is eligible for disability retirement, if, as determined by a member of the SERS medical review staff, he or she is unable to perform their current job and has at least 5 years of credited service. An officer of the State Police or an enforcement officer does not have a minimum service requirement.

#### **Formula for Disability Benefit**

The disability benefit is equal to the benefit calculated as of normal retirement age, based on years of credited service at disability, if the result is greater than or equal to 33-1/3 percent of FAS at time of disability. If the benefit so calculated is less than 33-1/3 percent of FAS, the disability benefit is equal to the smaller of:

- (a) the benefit calculated as of normal retirement age based on Service projected to retirement date, or
- (b) 33-1/3 percent of FAS at time of disability.

For service connected disabilities, the disability benefit payable will be increased, as needed, so that the sum of the plan benefit and the benefits paid or payable under the Workers' Compensation Act, The Pennsylvania Occupational Disease Act, and the Social Security Act equals 70 percent of FAS.

#### **Eligibility for Vested Benefit**

All Class A-3 and A-4 members have a vested entitlement to an annuity after 10 years of credited service. All other classes are vested after 5 years of credited service.

#### **Vested Benefit**

The vested benefit is equal to the benefit calculated using years of credited service at the time of leaving the plan. The former member can receive the full benefit beginning at normal retirement age, or an actuarially reduced withdrawal annuity beginning at any date after separation but before normal retirement age.

## State Employees' Retirement System

### **Benefit and Contribution Provisions as of December 31, 2014 (continued)** **(as embodied in Act 31 of 1974, and amended through Act 181 in October 2012)**

For those not in Classes A-3 or A-4, the withdrawal annuity is reduced from the earlier of age 60, or the age at which the member would have 35 years of credited service. Benefits for Park Rangers and Capitol Police who have 20 years of credited service (as Park Rangers and Capitol Police) are reduced from age 50. Benefits for other members who have an age 50 superannuation age are reduced from age 50 irrespective of the amount of credited service they have.

For Classes A-3 and A-4, the withdrawal annuity is reduced from age 65. If prior to age 65 the member has both reached 35 years of credited service and met the conditions of the Rule of 92, then the member is eligible for unreduced benefits. Benefits for Park Rangers and Capitol Police who have 20 years of credited service (as Park Rangers and Capitol Police) are reduced from age 55. Benefits for other members who have an age 55 superannuation age are reduced from age 55 irrespective of the amount of credited service they have.

#### **Eligibility for Death Benefit Prior to Retirement**

A member is eligible if the member (1) is under superannuation age with 5 years (or 10 years under Classes A-3 and A-4) of credited service or (2) has attained superannuation age with 3 years of credited state service.

#### **Amount of Death Benefit Prior to Retirement**

An eligible beneficiary receives the full present value of the benefits to which the member would have been entitled had the member retired the day before he or she died, assuming the member had elected Option 1 if no other option had been elected. This death benefit includes the present value associated with benefits, if any, to which the member may not have been entitled because they exceeded the member's highest consecutive twelve months of salary and are limited by appropriate IRS limitations.

#### **Death Benefits After Retirement**

A member who elects the maximum single life annuity is entitled to a refund of the unpaid balance of the accumulated member contributions and interest at the time of retirement. A member may elect one of several optional reduced pensions in lieu of the maximum single life annuity to provide additional death benefit protection. The optional forms of benefit are actuarially equivalent to the maximum single life annuity benefit using 4.0 percent interest per annum, compounded annually, and the actuarial equivalence factors described below.

The beneficiary of a disabled member who did not elect an alternative option receives benefits determined under Option 1. Option 1 provides that the beneficiary will receive a benefit equal to the present value of the maximum single life annuity at retirement reduced by any payments received by the annuitant. The Option 1 benefit is provided to a disabled member without any reduction in the member's benefit.

## State Employees' Retirement System

### **Benefit and Contribution Provisions as of December 31, 2014 (continued)** **(as embodied in Act 31 of 1974, and amended through Act 181 in October 2012)**

A Supplemental Death Benefit is payable to a beneficiary of a member who had a retirement benefit limited by 100 percent of final compensation. The Supplemental Death Benefit is the present value of the excess of the retirement benefit payable to the member before applying the 100 percent of final compensation limit, over the 100 percent of final compensation limit, subject to limits imposed by IRC Section 401(a)(9). If the benefit payable to the member is larger than the IRC Section 415(b) limit, the part of the Supplemental Death Benefit in excess of the IRC Section 415(b) limit will be payable from the Benefits Completion Plan. The Supplemental Death Benefit payment is in addition to any death benefit that may be paid as a result of the optional election.

#### **The “Extra Piece”**

The SERC provides for an “extra piece” to be added to the annual benefit if the member’s accumulated deductions exceed one-half of the actuarially equivalent value of the annual benefit. The extra piece is equal to the difference between the total accumulated deductions and one-half of the actuarially equivalent value of the annual benefit. This provision does not apply to Classes A-3 and A-4.

#### **Cost-of-Living Allowances (COLAs)**

Supplemental annuities applying cost-of-living increases to the benefits of annuitants have been instituted from time to time. The last cost-of-living increase was a two-stage increase under Act 2002-38. The first stage was applicable to annuitants who retired on or before July 1, 1990, and it became effective in July of 2002. The second stage provided cost-of-living increases to annuitants who retired after July 1, 1990, but prior to July 2, 2002, and it became effective in July of 2003.

#### **Rate of Member Contribution**

(i) Regular member contributions, excluding Social Security Integration contributions

<u>Class A-3</u> -	6.25 percent of total compensation
<u>Class A-4</u> -	9.30 percent
<u>Class AA</u> -	6.25 percent
<u>Class A</u> -	5.00 percent
<u>Class D-4</u> -	7.50 percent
<u>Class E-1</u> -	10.00 percent during the first 10 years of judicial service and 7.50 percent thereafter.
<u>Class E-2</u> -	7.50 percent

## State Employees' Retirement System

### **Benefit and Contribution Provisions as of December 31, 2014 (continued)** **(as embodied in Act 31 of 1974, and amended through Act 181 in October 2012)**

(ii) Additional contribution for Social Security Integration Credit

Any member who elects the Social Security Integration Credit pays 5.00 percent of any salary in excess of the amount of salary covered by Social Security during the year for which contributions are being made. A member electing to end additional contributions is ineligible to make future contributions or accrue future benefits.

(iii) Waiver of contributions

Members may elect to waive future contributions on an annual basis if their maximum single life annuity exceeds 110 percent of their highest calendar year compensation. This waiver does not apply to Classes A-3 and A-4.

#### **Interest Credited on Member Contributions**

A rate of 4 percent compounded annually, the statutory rate of interest, has been credited on the member contributions since the inception of the system.

#### **Refund of Accumulated Member Contributions**

On the death of a member not qualifying for death benefits, the accumulated member contributions and interest will be paid to the beneficiary. Upon application, a member terminating service when not eligible for another form of benefit is paid a refund of the accumulated contributions and interest. Other terminating members may elect to receive a lump sum payment of a portion of the present value of their benefit, not to exceed their accumulated contributions and interest under Option 4 as part of the members' option. Their lump sum payment results in a decrease to the annuity benefit otherwise payable. Under Act 120, Classes A-3 and A-4 are not eligible to receive a lump sum and reduced annuity under Option 4.

#### **Employer Contributions**

The employer pays the balance of the cost in excess of the members' contributions with payment schedules determined by law. Act 2010-120 made changes to the SERS funding rules which have significantly affected the required employer contributions. See Section III of Schedule O for the details.

#### **Actuarial Equivalence**

The actuarial table used to determine optional and early retirement benefits for members who entered service after August 1983 is the 1983 Group Annuity Mortality (1983 GAM) Unisex table.

## State Employees' Retirement System

### **Benefit and Contribution Provisions as of December 31, 2014 (continued)** **(as embodied in Act 31 of 1974, and amended through Act 181 in October 2012)**

Members who entered service before August 1983 receive the better of benefits based on the 1983 GAM table or a variation of the 1971 Group Annuity Mortality (1971 GAM) male table. The 1971 GAM table that applies in determining the benefits for members who entered service before August 1983 is:

For service before August, 1983:

Males (members or survivors) – 1971 GAM for males

Females (members or survivors) – 1971 GAM for males, set back 6 years

For service after August, 1983:

Members (male or female) – 1971 GAM for males, set back 6 years

Survivors (male or female) – 1971 GAM for males

### **Military Service**

Act 2012-181, effective December 31, 2012, brought SERS into compliance with the federal Heroes Earnings Assistance and Relief Tax Act of 2008 (HEART Act) and Uniformed Services Employment and Reemployment Rights Act of 1994 (USERRA) for State employees who go on military leave, and revised the purchase price formula for nonintervening military service for members seeking to purchase nonstate service credit for military service that does not qualify for USERRA benefits or that was performed before becoming a State employee. The primary impacts of Act 181 are:

- (i) Employees who return from USERRA qualified military leave receive vesting credit, even though they do not make member contributions to purchase credited service for the military leave.
- (ii) Employees who return from USERRA qualified military leave may make the member contributions that they would have made had they not gone on military leave and if they do so will be treated as if they remained in active State service for that time.
- (iii) Employees who die on military leave receive all SERS benefits that they would have received, except benefit accruals, as if they had returned to State service the day before their death.
- (iv) The Pennsylvania Military and Veterans Code provisions allowing State employees on military leave to continue to make member contributions and remain active members of SERS while on military leave have been repealed.

## State Employees' Retirement System

### **Benefit and Contribution Provisions as of December 31, 2014 (continued)** **(as embodied in Act 31 of 1974, and amended through Act 181 in October 2012)**

- (v) The purchase price for nonintervening military service for Class A-3 and Class A-4 members has been revised from the full actuarial value formula established in Act 2010-120 to the formula used by State employees who are members of the other classes of service, which is based on employee and employer normal contribution rates and the employees' compensation.

Given the past approach to funding the impact of military service-related events among SERS members and considering the overall changes in benefits related to military service and military leave resulting from Act 181, it was determined that Act 181 had no material impact on the future actuarial funding of SERS and thus did not produce a cost added by legislated benefit improvements that needed to be reflected in the final contribution rate.



## State Employees' Retirement System

### Actuarial Assumptions

This schedule shows the actuarial assumptions used for the valuation. With the exception of the investment return assumption, these assumptions were adopted by the Board based upon a review of experience under SERS from 2006 through 2010. Based upon subsequent review of the SERS investment data and results, the Board approved a reduction in the assumed annual investment return from 8.0% to 7.5% effective as of the December 31, 2011 actuarial valuation.

Schedule N contains an extract of the full set of rates used in the valuation. The full set of rates is in the Seventeenth Investigation of Actuarial Experience of the State Employees' Retirement System of the Commonwealth of Pennsylvania – January 12, 2011, which can be obtained from SERS. The rates are the probabilities that an event will occur in the year after the valuation and are all assumed to occur at the beginning of the year. For example, the male retirement rate of 25.0 percent at age 60 means that 250 of every 1,000 male employees age 60 and who are eligible for full benefits are expected to retire at the date of the valuation.

**Interest Rate:** 7.5 percent compounded annually. The assumed interest rate of 7.5 percent is the investment return less investment expenses.

#### **Mortality After Retirement:**

Non-disabled Retirees, Beneficiaries and Survivors: The RP-2000 Healthy Annuitant Mortality Table projected to 2008 and updated to reflect actual SERS experience through 2010. The table includes a margin for future improvement in life expectancy.

Disability Retirees: The RP-2000 Disabled Retiree Mortality Table projected to 2008 and updated to reflect actual SERS experience through 2010. The table includes a margin for future improvement in life expectancy.

**Spouse Age Difference:** Females are assumed to be 2 years younger than males.

**State Employees' Retirement System**

**Actuarial Assumptions (continued)**

**Demographic Assumptions for General Employees while Active Members**

Rates of Separation for Eligibility for Full Unreduced Benefits  
(35 years of credited service under age 60; 3 years of credited service over age 60)

<b>Representative Rates of Separation for Eligibility for Full Unreduced Benefits</b>		
<b>Age</b>	<b>Male</b>	<b>Female</b>
53	25.0%	23.0%
54	26.0	23.0
55	27.0	23.0
56	28.0	23.0
57 – 59	30.0	23.0
60	25.0	25.0
61	20.0	20.0
62	25.0	25.0
63 – 64	20.0	20.0
65	25.0	25.0
66 – 79	20.0	20.0
80	100.0	100.0

Rates of Separation for Eligibility for Reduced Benefits  
(only apply to members not eligible for full unreduced benefits)

<b>Representative Rates of Separation for Eligibility for Reduced Benefits</b>				
<b>Age</b>	<b>5 – 14 Years of Credited Service</b>		<b>15 or More Years of Credited Service</b>	
	<b>Male</b>	<b>Female</b>	<b>Male</b>	<b>Female</b>
25	1.0%	1.0%	N/A	N/A
30	1.5	1.5	N/A	N/A
35	1.5	1.5	1.5%	1.5%
40	1.0	1.0	1.5	1.5
45	1.0	1.0	1.5	1.5
50	1.0	1.0	2.0	2.0
55	1.0	1.0	5.5	5.5

## State Employees' Retirement System

### Actuarial Assumptions (continued)

#### Rates of Separation Due to Withdrawal

It is assumed that the benefit will be reduced from age 58 for general members (to factor 35 years of service before age 60) and from age 50 for members eligible for age 50 retirement.

Representative Rates of Separation Due to Withdrawal								
Age	Male				Female			
	Years of Credited Service				Years of Credited Service			
	0	5	9	14	0	5	9	14
20	20.7%	N/A	N/A	N/A	22.4%	N/A	N/A	N/A
25	16.2	0.8%	0.8%	N/A	20.5	2.7%	1.9%	N/A
30	13.9	0.8	0.6	0.6%	17.9	2.4	1.7	1.8%
35	13.6	0.7	0.4	0.4	12.8	1.9	1.2	1.3
40	13.0	0.5	0.4	0.4	10.0	1.9	0.7	0.5
45	12.1	0.5	0.2	0.2	9.8	1.8	0.7	0.5
50	11.3	0.5	0.2	0.2	9.8	1.8	0.4	0.5
55	11.3	0.6	0.6	0.6	9.8	1.5	1.2	1.2

#### Rates of Separation Due to Death and Disability

(Disability rates only apply to members not eligible for full retirement)

Representative Rates of Separation Due to Death and Disability				
Age	Death		Disability	
	Male	Female	Male	Female
20	0.04%	0.02%	N/A	N/A
25	0.04	0.02	0.02%	0.04%
30	0.05	0.02	0.07	0.09
35	0.06	0.03	0.12	0.16
40	0.08	0.04	0.19	0.21
45	0.12	0.06	0.33	0.33
50	0.22	0.09	0.46	0.50
55	0.27	0.14	0.60	0.63
60	0.32	0.24	N/A	N/A

**State Employees' Retirement System**

**Actuarial Assumptions (continued)**

**For Special Benefit Classes if Different from General Employee Rates:**

<b>Rates of Separation Due to Withdrawal</b>			
<b>Years of Service</b>	<b>State Police/ Hazardous Duty</b>	<b>Legislators</b>	<b>Judicial Officers</b>
0	15.0%	5.0%	2.0%
1	5.0	5.0	2.0
2	3.0	5.0	1.0
3	2.5	10.0	1.0
4	1.5	5.0	1.0
5	0.9	10.0	0.5
6	0.7	5.0	0.5
7	0.6	5.0	0.4
8	0.4	5.0	0.4
9	0.3	5.0	0.3
10+	0.2	1.3	0.3

<b>Rates of Separation Due to Early Retirement at Any Age</b>		
<b>State Police/ Hazardous Duty</b>	<b>Legislators</b>	<b>Judicial Officers</b>
0.8%	3.0%	0.5%*

\* The Judicial Officer rate increases to 1.2% beginning at age 50.

<b>Representative Rates of Separation Due to Retirement other than State Police with 19 or More Years of Credited Service</b>			
<b>Age</b>	<b>State Police/ Hazardous Duty</b>	<b>Legislators</b>	<b>Judicial Officers</b>
50	7.0%	5.0%	N/A
55	7.0	7.5	2.3%
60	12.0	12.0	5.0
65	25.0	25.0	10.0
70	25.0	25.0	100.0
75	25.0	25.0	N/A
80	100.0	100.0	N/A

## State Employees' Retirement System

### Actuarial Assumptions (continued)

Rates of Separation due to Retirement for State Police with 19* or More Years of Credited Service			
Years of Service	Rate	Years of Service	Rate
19* – 23	5.0%	31	20.0%
24*	15.0	32 – 34	40.0
25	50.0	35 – 39	50.0
26 – 29	20.0	40+	100.0
30	30.0		

\* State Police with 19 and 24 years of service at the beginning of the year are assumed to retire at the point they reach 20 and 25 years respectively during the year and to receive the FOP award.

### Years of Service Purchased by Eligible Members

Service	Number of Years Purchased
0	0.4
1	0.3
2	0.2
3	0.1
4+	0.0

It is assumed that the member will elect to pay for the reduction through an actuarial debt and that all purchased service is a 2 percent accrual. Under Act 2010-120 and Act 2012-181, the assumed years purchased as shown above were reduced by 9% for Classes A-3 and A-4.

**Form of Payment:** Members are assumed to elect the maximum benefit 33 percent of the time, some form of joint and survivor annuity 26 percent of the time, and some form of guaranteed present value (including joint and survivor with a guaranteed present value) 41 percent of the time. Also, 85 percent of members are assumed to elect a full Option 4 withdrawal of contributions and interest.

### Career Salary Increases

The career salary scale shown on the following page includes average increases in the employee salary due to promotions and longevity growth. The average career salary growth is 3.05 percent per year.

## State Employees' Retirement System

### Actuarial Assumptions (continued)

In addition, it is assumed that the salary schedules will increase by 3.05 percent per year. The scale below does not include the assumed 3.05 percent general salary increase.

<b>Career Salary Scale for Members</b>			
<b>Years of Credited Service</b>	<b>Annual Increase</b>	<b>Years of Credited Service</b>	<b>Annual Increase</b>
1	8.00%	16	2.50%
2	6.00	17	2.40
3	4.50	18	2.30
4	4.00	19	2.20
5	3.75	20	2.10
6	3.50	21	2.00
7	3.25	22	1.90
8	3.20	23	1.80
9	3.15	24	1.70
10	3.10	25	1.60
11	3.00	26	1.50
12	2.90	27	1.40
13	2.80	28	1.30
14	2.70	29	1.25
15	2.60	30+	1.25

The above scale does not apply to members in Classes D and E. It is assumed that only the general salary increase (3.05 percent per year) would apply to members in these classes.

### Class A-3 and A-4 Assumptions

The following tables are the early and superannuation retirement rates applicable to Class A-3 and A-4 members.

**State Employees' Retirement System**

**Actuarial Assumptions (continued)**

<b>Early Retirement Rates for Class A-3 and Class A-4 Active Employees with 10 or more Years of Service</b>	
<b>Ages</b>	<b>Rate</b>
35	1.5%
40	1.5
45	1.5
50	2.0
55	5.5
60	5.5
61	6.0
62	20.0
63	10.0
64	15.0
65	N/A

<b>Superannuation Retirement Rates for Class A-3 and Class A-4 Employees</b>	
<b>Age</b>	<b>Rate</b>
55	15.0%
56	16.0
57	17.0
58	18.0
59	19.0
60	20.0
61	20.0
62	25.0
63	20.0
64	20.0
65	25.0
66 to 79	20.0
80	100.0

# State Employees' Retirement System

## Actuarial Methods

### **I. Asset Valuation**

The actuarial value of assets is developed by recognizing the difference between the expected actuarial value of assets and the market value of assets over a five-year period. The expected actuarial value is last year's actuarial value brought forward to reflect actual contributions, benefit payments and expenses, and assumed investment income. Each year 20 percent of the difference between this expected value and the market value is recognized in determining the current actuarial value of assets with the remaining 80 percent to be recognized over the next four years.

### **II. Funding Method**

The State Employees' Retirement System funding policy provides that the actuary determine employer contribution rates that will amortize liabilities over a ten-year or 30-year period beginning with the July first following the measurement of the liability. See Section III below for details regarding the specific liabilities subject to amortization and the applicable amortization periods. This policy assures that the SERS is appropriately funded and also that the fund will accumulate sufficient assets to pay benefits when they are due. The policy is set by the State Employees' Retirement Board in conformance with specific legal requirements as to the method of funding.

A variation of the Entry-Age Actuarial Cost Method is used to determine the liabilities and costs related to all SERS benefits including retirement, withdrawal, death and disability benefits. The significant difference between the method used for SERS and the typical Entry-Age Actuarial Cost Method is that the normal cost is based on the benefits and contributions for new employees rather than for all current employees from their date of entry. The SERS variation should produce approximately the same results as the typical method over the long run.

### **III. Determination of the Annual Contribution**

The annual employer contribution is equal to the sum of the following:

- (1) The employer share of the normal cost.
- (2) The fresh start amortization of the December 31, 2009 unfunded liability over a 30-year period beginning July 1, 2010 and ending on June 30, 2040.
- (3) The amortization of the change in liability due to Act 2010-120 over a 30-year period beginning July 1, 2011 and ending on June 30, 2041.
- (4) The amortization of changes in liability due to actual experience differing from assumed experience after December 31, 2009 over 30-year periods beginning with the July first following the actuarial valuation determining such changes.
- (5) The amortization of legislated benefit changes, including cost-of-living increases, over 10-year periods beginning with the July first following the actuarial valuation determining such changes. (Note: There are currently no 10-year amortizations being funded.)



## State Employees' Retirement System

### Actuarial Methods (continued)

The amortization payments are level amounts over the remaining applicable amortization period. The employer cost is determined as a percent of compensation, and the employer contributes that percent of the compensation of all covered members during each fiscal year. The pre-collared employer contribution level for fiscal year 2015/2016 is the total of (1) the employer normal cost percent and (2) the net amortization payment for fiscal year 2015/2016 divided by the projected covered compensation for the fiscal year. However, Act 2010-120 established employer contribution collars for the purpose of temporarily limiting the extent of annual increase in the employer contribution rate.

To determine the maximum 2015/2016 employer contribution rate under Act 2010-120, we add the fiscal 2015/2016 contribution collar of 4.5 percent of payroll to the final 2014/2015 employer contribution requirement of 20.50 percent of payroll, to produce a result of 25.00 percent of compensation. No legislation enacted since the prior valuation resulted in any costs added by legislated benefit changes that would impact the December 31, 2014 actuarial valuation results. Therefore, the 2015/2016 employer contribution rate is limited to 25.00 percent of covered compensation, below the uncollared rate (31.51 percent of covered compensation) that would otherwise be required. The 4.5 percent contribution collar established under Act 2010-120 will limit the annual increase in the employer contribution rate for each fiscal year after fiscal 2012/2013 until the collar ceases to apply, after which the uncollared contribution rates apply (subject to a minimum employer contribution rate equal to the employer normal cost percent).

The assumptions used in determining the actuarial cost are stated in Schedule N, and the employer cost, as a percent of covered compensation, is determined in Schedules A and B. Except for the 7.5 percent investment return assumption, which has been used since the December 31, 2011 valuation, the assumptions used for the current valuation were based upon an evaluation of SERS experience from 2006 through 2010.

The annual investment return assumption is 7.5 percent compounded annually. Salary growth is the total of assumed increases in salary rates and career salary growth. It is generally assumed that the total payroll will increase at 3.05 percent per year and that employee career salary growth (promotion and longevity growth) will average an additional 3.05 percent per year. Therefore, the average total salary growth for an individual will generally be 6.10 (3.05 plus 3.05) percent per year. The investment return and the salary rate increase assumptions are based on an assumed underlying inflation of 2.75 percent per year.

All costs and liabilities have been determined in conformance with generally accepted actuarial principles and procedures in accordance with the principles of practice prescribed by the Actuarial Standards Board of the American Academy of Actuaries. The calculations were performed on the basis of actuarial assumptions and methods which are reasonable (taking into account the past experience of SERS and reasonable expectations) and which represent our best estimate of anticipated experience under the plan.

## State Employees' Retirement System

### Actuarial Methods (continued)

#### IV. Allocation of the Annual Contribution Among Employer Groups

The annual employer contribution (total employer cost) is expressed as a percentage of the total projected covered compensation for active members. This amount is reflected on Schedule B, line IV, and is referred to as the total employer cost. The total employer cost is the average contribution amount that needs to be received from the employer groups participating in the system. Therefore, some employer groups contribute a higher percent of compensation, and some employer groups contribute a lower percent of compensation.

Schedule C develops the contribution rate for each of the employer groups. The allocation method used to determine the employer rate takes into consideration the cost of additional benefits for special classes of members. For example, the contribution rate for Class E members takes into consideration the additional accrual rate those members receive at retirement. The Base Contribution Rate (column 2 on Schedule C) is determined as the percentage needed to produce employer contribution amounts by class that, when added together, equal the total employer contribution.

The following is an explanation of the elements of Schedule C.

Column (1) is the employer group.

Column (2) is the Base Contribution Rate. The Base Contribution Rate is the amount needed to fund the benefits for Class A-3 (65) members. Because the majority of SERS new entrants will be covered under Class A-3 (65), the 2.0 percent accrual rate for that class is used to determine the base contribution rate.

Column (3) is the additional cost for members who are eligible to retire with unreduced benefits at age 50 or 55. The age 50/55 normal cost is determined for two groups of members: members who can retire at age 50/55 if they have 3 years of credited service, and members who can retire at age 50/55 once they obtain 20 service credits. Park Rangers and Capitol Police fall into the latter category. The additional cost for members who can retire at age 50/55 if they have 3 years of credited service is larger than the additional cost for members who can retire at age 50/55 if they have 20 years of credited service.

Column (4) is the multiplier adjustment to the basic benefit, which is applicable to members in classes that receive a different percent accrual rate than the accrual rate for Class A-3 members. The normal cost is determined for members who would receive the standard 2.0 percent single life annuity set by Act 120 (Class A-3). For example, members in Class AA receive an annuity equal to 1.25 times the standard Class A-3 single life annuity. The multiplier adjustment (Column (4)) for Class AA is 1.4472, which includes the 1.25 multiplier plus some additional adjustments (e.g., differences in superannuation age and limitations on Option 4 withdrawals under Act 120). There currently are no multiplier adjustments less than the 1.0.

## State Employees' Retirement System

### Actuarial Methods (continued)

Column (5) is the past-service liability component for certain employee groups. These employee groups were granted benefit improvements that were retroactive at the date of passage and, therefore, cover all credited service for the class. Upon establishment of a benefit improvement it was determined that the employers of the individual employee group, not the Commonwealth, would fund the benefit improvement.

At implementation of the new benefit provision, a liability is established for the members who are eligible for the new benefit provisions, and a schedule is determined to pay off the increase in liability. For example, Park Rangers and Capitol Police Officers were formerly covered under the age 60 retirement provisions. Effective with the valuation at December 31, 1992, Park Rangers and Capitol Police Officers became eligible to retire at age 50 upon attaining 20 years of service (as Park Rangers and Capitol Police Officers). At that valuation, a liability was established that would fund the increase in benefits.

The liability for the increase in benefits for past service is paid off in equal installments by the employers of the member group. Each year, the annual contribution as a percent of payroll is determined as the annual payment divided by the funding payroll for the group. The outstanding balance is carried forward with interest each year.

The following table shows the payment schedule for the two groups of employees who have a past service liability.

<b>Amortization Schedule for Past Liabilities</b>		
<b>Employer Group</b>	<b>Payment</b>	<b>Last Payment (fiscal year beginning)</b>
State Police	\$17,596,938	July 2029
Park Rangers / Capitol Police	\$87,124	July 2027

Column (6) is the adjusted contribution rate, and is equal to column (2) plus column (3), multiplied by column (4). Column (5) is added.

Column (7) is the projected compensation for the class of employees. The projected compensation is for the fiscal year to which the contribution rate is applicable.

Column (8) is the dollar amount of the employer group contribution. Except when the base employer contribution rate is zero, the sum of the dollar amounts for each group is (approximately) equal to the total employer contribution (as a percent of covered compensation) multiplied by the total projected covered compensation for the active members.

## State Employees' Retirement System

### Actuarial Methods (continued)

#### **V. Plan Provisions Not Valued**

The cost effect of two plan provisions was not included in this valuation because the effect of the provisions is minimal. These are the limit on the amount of retirement benefit imposed by Section 5702(c) (100 percent limit) and the supplemental death benefit payable when the retirement benefit is limited by Section 5702(c).

These two provisions are not valued because they only apply to very few SERS members. Since by definition the liability for the supplemental death benefit is lower than the reduction in liability for the 100 percent limit, the net effect of not including these provisions in the actuarial valuation is a minimal overstatement in the total employer cost.

#### **VI. Determination of Present Value of Benefits for Inactive and Vested Members**

The present value of benefits for inactive members not currently receiving benefits is determined using the same methods and procedures as for active members. They are valued using the final average compensation and service as of separation and are assumed to begin receiving benefits in accordance with the active employee assumptions.

## State Employees' Retirement System

### Glossary

Accrued Service. Service credited under the system, which was rendered before the date of the actuarial valuation.

Active Participants. Active members who are in a position covered by SERS and on payroll, on leave with pay, or on certain unpaid leave (e.g., military leave). Inactive members on leave without pay are also included as active participants if there is an expectation they will return to paid service.

Actuarial Accrued Liability. The portion of the actuarial present value of benefits not provided for by the actuarial present value of future normal costs. Also referred to as Past Service Liability.

Actuarial Assumptions. Estimates of future experience with respect to rates of mortality, disability, turnover, retirement, investment income and salary growth. Decrement assumptions (rates of mortality, disability, turnover and retirement) are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (salary increases and investment income) consist of an underlying rate in an inflation-free environment plus a provision for a long-term average rate of inflation.

Actuarial Cost Method. A mathematical budgeting procedure for allocating the actuarial present value of future benefits between future normal costs and the actuarial accrued liability.

Actuarial Present Value. The amount of funds currently required to provide a payment or series of payments in the future. It is determined by discounting projected future payments at assumed rates of interest and probabilities of payment.

Amortization. Paying off an amount with periodic payments of interest and principal -- as opposed to paying off with a lump sum payment.

Annuitants. Participants of SERS who are currently receiving benefits for reason of superannuation retirement, early retirement, deferred retirement, or disability retirement.

Beneficiaries and other payment recipients. Beneficiaries, survivors or alternate payees who are receiving benefits as a result of the death of an active member or annuitant or due to a divorce (based upon a domestic relations order).

Funding Payroll. The contribution determinations for the funding of SERS are based on a fiscal year running from July 1 to June 30. The Total Annualized Compensation is adjusted to an appropriate fiscal year Funding Payroll using the salary scale assumption and expected turnover and replacement estimates.

Inactive and Vested Participants. In general, inactive and vested participants are former active members who are not expected to return to paid service in a position covered by SERS. Inactive and vested participants include employees on furlough as well as employees with prior SERS service currently participating in the Pennsylvania Public School Employees' Retirement System (PSERS).

## State Employees' Retirement System

### Glossary (continued)

All inactive and vested participants are entitled to either a refund of accumulated deductions from SERS or a monthly benefit. Inactive and vested participants will eventually change statuses; for example, they may terminate non-vested and receive a refund of their accumulated deductions, they may retire and commence annuity payments, they may return to active membership, etc.

Total Annualized Compensation. The Total Annualized Compensation is a snapshot of compensation on December 31. For full-time employees, it is equal to the compensation during the calendar year ending December 31. For part-time employees, compensation is annualized using the current rate of compensation times the appropriate number of pay periods.

Total Normal Cost. The portion of the actuarial present value of future benefits that is allocated to the current year by the actuarial cost method.

Unfunded Actuarial Accrued Liability. The difference between actuarial accrued liability and the actuarial value of assets.



## 2014 Benefits Completion Plan Report



# Commonwealth of Pennsylvania State Employees' Retirement System

2014 Benefits Completion Plan





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June 10, 2015

Mr. David E. Durbin  
Executive Director  
State Employees' Retirement System  
30 North Third Street - Suite 150  
Harrisburg, PA 17101-1716

Dear Mr. Durbin:

The purpose of this letter is to recommend the amount of employer contributions necessary to sustain the Benefits Completion Plan. Section 415(b) of the Internal Revenue Code (IRC) limits the benefits that can be paid to members of the Pennsylvania State Employees' Retirement System (SERS) from the SERS Defined Benefit Plan. The benefit from the Benefits Completion Plan is the benefit that would have been paid in the absence of the IRC Section 415(b) limit less the benefit that is being paid from the SERS Defined Benefit Plan.

The December 8, 2003 ruling letter from the Internal Revenue Service (IRS) stated that the contribution to the Benefits Completion Plan during each fiscal year would be limited to the amount sufficient to fund benefits payable during the calendar year that starts in the fiscal year. This report determines the recommended contribution for the fiscal year beginning July 1, 2015. In accordance with the IRS letter, we based the contribution for the fiscal year beginning July 1, 2015 on a projection of the benefits payable from the Benefits Completion Plan fund through December 31, 2016.

The Benefits Completion Plan pays both retirement annuities and death benefits. The retirement annuities are reasonably predictable. Lump sum death benefits are less predictable. Some of the death benefits are very large and could become payable at any time. At one extreme there could be no large death benefits in a year. However, there could be one or more large death benefits payable in any given year.

In October 2006 we prepared a report on the long-term financing of the Benefits Completion Plan. Based on that report we proposed that the Benefits Completion Plan contribution be set at a high enough level to ensure that the fund was large enough to pay the two highest potential death benefits. Based upon this policy, our subsequent annual reviews of the status of the fund, and our annual fund balance projections, we recommended the following contribution rates:

Fiscal year beginning July 1, 2007	0.04 percent of payroll
Fiscal year beginning July 1, 2008	0.04 percent of payroll
Fiscal year beginning July 1, 2009	0.01 percent of payroll
Fiscal year beginning July 1, 2010	0.01 percent of payroll

Mr. David E. Durbin  
 June 10, 2015  
 Page 2 of 2

Fiscal year beginning July 1, 2011	0.01 percent of payroll
Fiscal year beginning July 1, 2012	0.09 percent of payroll
Fiscal year beginning July 1, 2013	0.05 percent of payroll
Fiscal year beginning July 1, 2014	0.03 percent of payroll

Now, based upon our review of the status of the fund as of December 31, 2014, our fund balance projections through December 31, 2016 and the policy described above, we recommend that SERS implement a contribution rate of 0.01 percent of payroll for the year beginning July 1, 2015.

There are currently 23 participants of the Benefits Completion Plan receiving retirement annuity payments and 43 active employees who could potentially retire before December 31, 2016 with entitlement to Benefits Completion Plan payments. This report projects the fund based on the expected benefits for those participants and employees.

#### **Actuarial Certification**

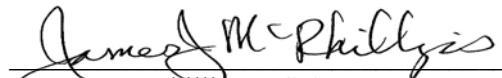
To the best of our knowledge, this report is complete and accurate and all costs and liabilities have been determined in conformance with generally accepted actuarial principles and on the basis of actuarial assumptions and methods which are reasonable (taking into account the past experience of SERS and reasonable expectations) and which represent our best estimate of anticipated experience under the plan.

The actuaries certifying to this valuation are members of the Society of Actuaries or other professional actuarial organizations, and meet the General Qualification Standards of the American Academy of Actuaries for purposes of issuing Statements of Actuarial Opinion.

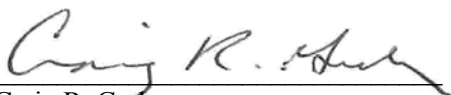
Respectfully Submitted,  
 Hay Group, Inc.



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## **Pennsylvania State Employees' Retirement System Benefits Completion Plan**

The Pennsylvania State Employees' Retirement System (SERS) administers two defined benefit plans. The Defined Benefit Plan covers all eligible Pennsylvania employees and annuitants. The Benefits Completion Plan provides benefits to certain annuitants whose Defined Benefit Plan benefits are limited by Internal Revenue Code (IRC) Section 415(b).

This report presents the current status of the Benefits Completion Plan as of December 31, 2014 and recommends an employer contribution for the plan for the fiscal year beginning July 1, 2015. The employer contribution for the Benefits Completion Plan will be added to the employer contribution for the Defined Benefit Plan to set the total retirement contribution for the fiscal year beginning July 1, 2015.

### **Benefits Payable from the Benefits Completion Plan Trust Fund**

In general, IRC Section 415(b) limits a pension plan participant's annual benefit attributable to employer contributions to a specified dollar limit. For the 2015 calendar year, the IRC Section 415(b) limit is \$210,000. This \$210,000 limit also applied in calendar year 2014.

The Internal Revenue Service adjusts the IRC Section 415(b) limit for inflation on an annual basis. However, in any given year there will be no increase to the IRC Section 415(b) limit unless cumulative inflation is enough to result in an annual increase of at least \$5,000. Thus, the limit will not necessarily increase every year.

The IRC Section 415(b) limit is adjusted to its actuarial equivalence at certain pension plan participant ages. If a participant retires before age 62, the IRC Section 415(b) limit is reduced to its actuarial equivalent at the participant's retirement age. If a participant retires after age 70, the IRC Section 415(b) limit is increased to its actuarial equivalent at the participant's retirement age.

The IRC Section 415(b) limit is further adjusted for the actuarial value attributable to the withdrawal of an amount equal to the pension plan participant's pick up contributions with interest. The IRC Section 415(b) limit is also adjusted actuarially for certain optional benefit forms and adjusted for annuities based on less than 10 years of service credit.

The Benefits Completion Plan will pay both retirement and death benefits that exceed the IRC Section 415(b) limit. Death benefits can be paid either on the death of a retired participant receiving benefits from the Benefits Completion Plan or on the death of an employee.

In almost all cases, SERS benefits are also limited to no more than 100 percent of compensation. In general, the Benefits Completion Plan does not pay benefits that, together with the Defined Benefit Plan, are greater than 100 percent of compensation. An exception to this limit includes certain participants eligible for actuarial increases due to retirement beyond age 70. For such participants, the 100 percent of salary limit does not apply to the actuarial increase portion of the participant's benefit. For all others, the monthly retirement benefit payable from the Benefits Completion Plan is the difference between:

- 1 – The total benefit that would have been paid with the 100 percent limit but without the IRC Section 415(b) limit; and,
- 2 – The actual benefit that is paid from the Defined Benefit Plan.

SERS pays a death benefit that is based on the full SERS monthly annuity without either the IRC Section 415(b) or 100 percent of pay limit but no more than the benefit permitted under IRC Section 401(a)(9) of the Internal Revenue Code. The SERS death benefit is the total of (a) the death benefit based on the monthly annuity limited by 100 percent of pay and (b) a supplemental benefit equal to the full benefit less the benefit limited by 100 percent of pay, subject to the IRC Section 401(a)(9) limits on incidental death benefits. The supplemental death benefit is payable from the Defined Benefit Plan to the extent permitted by IRC Section 415(b). Therefore, the death benefit payable from the Benefits Completion Plan is the difference between:

- 1 – The total benefit that would have been paid without either the 100 percent limit or the IRC Section 415(b) limit; and,
- 2 – The actual benefit that is paid from the Defined Benefit Plan.

A retiree or survivor is a participant of the Benefits Completion Plan if the retiree/survivor is currently drawing benefits from the Benefits Completion Plan. An employee is not currently a participant of the Benefits Completion Plan even if the projected benefits for the employee are greater than the IRC Section 415(b) limit. The employee will become a participant of the Benefits Completion Plan only after the employee retires and begins to draw benefits from the plan. Retirees/survivors who become participants of the Benefits Completion Plan will generally remain participants unless and until the IRC Section 415(b) limit is increased to the point that the benefit payable to them from the Defined Benefit Plan is not limited.

#### *Monthly Retirement Benefit*

The monthly benefit payable from the Benefits Completion Plan is the benefit that would have been paid without the IRC Section 415(b) limit less the benefit that is being paid from the Defined Benefit Plan. The example below illustrates the retirement benefits payable from the retirement system and the limits that affect the monthly benefits payable.

Example of a Monthly Retirement Benefit Payable from the Benefits Completion Plan

<b>TABLE 1</b>		
<b>A.</b>	Benefit payable to the participant based on option selected.	\$215,000
<b>B.</b>	Retirement Code 100 percent of pay limit.	212,000
<b>C.</b>	Retirement benefit payable from the SERS Defined Benefit Plan, limited by 100 percent of pay. (lesser of A. and B.)	212,000
<b>D.</b>	IRC Section 415(b) limit.	210,000
<b>E.</b>	Retirement benefit payable from the SERS Defined Benefit Plan, limited by IRC Section 415(b) limit and 100 percent of pay. (lesser of C. and D.)	210,000
<b>F.</b>	Retirement benefit payable from the Benefits Completion Plan. (difference between C. and E., but not less than \$0)	2,000

The 100 percent of salary limit (line B. above) is applied in determining the benefit that would have been paid without the IRC Section 415(b) limit. Therefore, the Benefits Completion Plan and the Defined Benefit Plan, in combination, do not pay retirement benefits that exceed 100 percent of final compensation. Although a Supplemental Death Benefit would also apply in this example, it is not being illustrated here. See Example 2 in the Appendix for an illustration of the handling of a Supplemental Death Benefit.

*Death Benefit*

There are three types of death benefits payable from the Benefits Completion Plan. The Appendix includes examples of each type of benefit. The types are:

- ✓ Death benefits payable to beneficiaries of active participants who have an annual retirement benefit in excess of the IRC Section 415(b) limit and who die in service (see example 1 in the Appendix); and
- ✓ Death benefits payable to beneficiaries of retired participants who selected Option 1 and who have an annual retirement benefit in excess of the IRC Section 415(b) limit (see example 2 in the Appendix); and
- ✓ Death benefits payable to survivor annuitants based on the optional benefit chosen by the participant at retirement, where the annual survivor benefit payable is in excess of the IRC Section 415(b) limit (see example 3 in the Appendix).

Participants who die in service and were eligible to receive a retirement benefit are assumed to have retired the day before death and elected an Option 1 benefit. If the Option 1 death benefit is in excess of the benefit payable under the IRC Section 415(b) limit, the Defined Benefit Plan will pay the amount of the benefit attributable to the annuity up to the IRC Section 415(b) limit, and the Benefits Completion Plan will pay the remainder of the death benefit. Example 1 in the Appendix illustrates the death benefits payable from the SERS Defined Benefit Plan and the Benefits Completion Plan if an active participant dies in service.

A Supplemental Death Benefit is payable to a beneficiary of a participant who had a retirement benefit limited by 100 percent of final compensation. The Supplemental Death Benefit is the present value of the excess of the retirement benefit payable to the participant before applying the 100 percent of final compensation limit over the 100 percent of final compensation limit, subject to limits imposed by IRC Section 401(a)(9). If the benefit payable to the participant is larger than the IRC Section 415(b) limit, the part of the Supplemental Death Benefit in excess of the IRC Section 415(b) limit will be payable from the Benefits Completion Plan. Example 2 in the Appendix illustrates this case.

If a participant chooses a joint and survivor benefit at retirement and the benefit is limited by the IRC Section 415(b) limit (as shown in the example in Table 1), the participant will receive a retirement benefit from the SERS Defined Benefit Plan and the participant will receive a retirement benefit from the Benefits Completion Plan. It is possible that part of the survivor benefit payable after the participant's death would also be payable from the Benefits Completion Plan. Example 3 in the Appendix illustrates a situation where a survivor benefit would be payable from the Benefits Completion Plan based on the optional benefit the participant elected at retirement. Example 4 shows a situation where a survivor benefit would not be payable. The examples illustrate the benefit payable based on an Option 2 (100 percent joint and survivor annuity) and an Option 3 (50 percent joint and survivor annuity).

## Status of the Fund

Table 2 shows the progress of the fund in calendar year 2014. The fund began at about \$3,910,000 and increased by \$960,000 to about \$4,870,000.

Beginning Balance – December 31, 2013	\$3,910,901
Income	
Contributions	2,278,228
Investment Income	6,564
Total Income	2,284,791
Expenses	
Benefit Payments	
Supplemental Benefit Payments	32,212
Regular Benefit Payments	1,282,048
Benefits Payable	-
Total Benefit Payments	1,314,260
Administrative Expenses	12,453
Total Expenses	1,326,713
Ending Balance – December 31, 2014	\$4,868,979

Note: Some calculation results above may differ slightly due to rounding.

## Actuarial Assumptions

The actuarial assumptions used for this valuation of the Benefits Completion Plan are the actuarial assumptions that are used for the December 31, 2014 valuation of the Defined Benefit Plan, with the exceptions noted below.

The Benefits Completion Plan Trust Fund will be invested in short-term investment funds in the SERS Treasury Account. Because this fund earned only 0.1 percent interest in 2013 and 0.1 percent interest in 2014, a 0.0 percent interest rate was assumed for projection purposes.

Administrative expenses include actuarial and legal fees that are charged directly to the Fund. The Fund paid \$12,000 in expenses in 2014 and 2013, \$13,000 in expenses in 2012, \$15,000 in expenses in 2011, \$16,000 in expenses in 2010, \$17,000 in expenses in 2009, \$15,000 in 2008, and \$13,000 in 2007. The 2006 expenses were \$41,000, which included payment for a study of

the long-term funding levels for the Benefits Completion Plan. This study was not performed in any subsequent years, so we assume expenses of \$20,000 on an annual basis.

The IRC Section 415(b) limit could increase on January 1, 2016. However, for purposes of this valuation, it is assumed that the limit will remain flat. If the limit increases on January 1, 2016, it is likely that the benefit payments from the Benefits Completion Plan will be lower than projected.

Assumed future salary increases will be 4.3 percent a year. The Defined Benefit Plan valuation assumes a 3.05 percent general increase plus an individual increase that averages 3.05 percent for a total of 6.1 percent on average. The individual increase is inversely related to service. Because most of these employees have substantial service, we used a salary increase rate that was lower than the average for all years of service.

In determining the liability for the Benefits Completion Plan, it is assumed that employees who terminate and apply for an annuity before superannuation age will elect to begin benefits immediately. The Defined Benefit Plan valuation assumes a portion of the terminating members will elect a deferred benefit.

For purposes of the Benefits Completion Plan valuation, it is assumed that future retired participants will choose the full retirement allowance (single-life annuity) option, and the participant will not withdraw any contributions or interest. Assuming the participant elects a full retirement allowance produces a conservative estimate because the 415(b) limit is not subject to reduction when a participant elects to cover a spouse under an Option 2 or an Option 3 (i.e., joint and survivor annuity) election. When a participant withdraws contributions and interest, under an Option 4 lump sum withdrawal, the 415(b) limit is reduced by more than the actual benefit is reduced. Therefore, one aspect of this assumption is conservative and the other aspect is not. We believe that the net effect of these assumptions results in a reasonable estimate of the Benefits Completion Plan liability. The Defined Benefit Plan valuation assumes a portion of the retired members will elect an alternative form of annuity. As with the Defined Benefit Plan valuation, retirements are assumed to occur on January 1 in the Benefits Completion Plan valuation.

### **Determination of the Recommended Contribution**

The Benefits Completion Plan contribution is set for one year at a time based on projected payouts for two years. However, it is useful to consider the long-term cost of the Benefits Completion Plan. Hay Group estimated the projected long-term cost of the Benefits Completion Plan in future years and presented the results in a report issued on October 6, 2006. The primary finding of that report was that the net Benefits Completion Plan payments, as a percent of total SERS payroll, were projected to increase gradually to a peak of 0.05 percent of pay in 2016 to 2018. The payment was then expected to decline because the great majority of the Benefits Completion Plan benefits were expected to be payable to participants who joined SERS before January 1, 1996, who would be retired or nearing retirement by 2016-2018. This was due to the fact that SERS members hired prior to 1996 do not have their compensation limited under IRC Section 401(a)(17) for purposes of computing their benefits under both the Defined Benefit Plan and the Benefits Completion Plan. Post-1995 hires, on the other hand, are subject to these IRC



compensation limits, thereby somewhat reducing the likelihood that members of this group would become eligible for benefits payable from the Benefits Completion Plan.

Through June 30, 2011, actual net Benefits Completion Plan payments were, in fact, lower than projected in 2006, reducing the required annual contributions to fund the Benefits Completion Plan, as further explained in this paragraph. In our 2008 Benefits Completion Plan actuarial report we noted that in early 2009, an active employee with a large potential death benefit had retired and did not elect an Option 1 (guaranteed present value) benefit. The individual was also not eligible for a Supplemental Death Benefit. Since a death benefit was no longer potentially payable from the Benefits Completion Plan for this individual, we considered the fund to be sufficient to fund the two highest potential death benefits. Consequently, we recommended, for the fiscal year beginning July 1, 2009, that the contribution rate be reduced from 0.04 percent to 0.01 percent of payroll. During 2009, another active employee with a large potential death benefit retired and did not elect an Option 1 benefit. Therefore, for the fiscal year beginning July 1, 2010, we recommended that the contribution rate remain at 0.01 percent of payroll. During 2010, an active employee with a large potential death benefit retired and elected an Option 1 benefit. Even with this new liability, the fund assets were sufficient for the contribution rate to remain at 0.01 percent of payroll for the fiscal year beginning July 1, 2011.

During fiscal year 2011-2012, a pre-retirement death led to a large obligation due from the Benefits Completion Plan. In order to meet this obligation and also replenish the Benefits Completion Plan fund to cover potential future obligations, we recommended that the contribution rate be increased to 0.09 percent of payroll beginning July 1, 2012.

Our review of the fund as of December 31, 2012 and our fund balance projections through December 31, 2014 indicated that a somewhat lower level of funding (than required during the prior fiscal year) would suffice for the fiscal year beginning July 1, 2013. In order to meet the significant upcoming obligations of the Benefits Completion Plan and to continue the replenishment of the fund, we recommended a contribution rate of 0.05 percent of payroll for the fiscal year beginning July 1, 2013.

Our review of the fund as of December 31, 2013 and our fund balance projections through December 31, 2015 indicated that a somewhat lower level of funding (than required during the prior fiscal year) would suffice for the fiscal year beginning July 1, 2014. Therefore, we recommended a contribution rate of 0.03 percent of payroll for the fiscal year beginning July 1, 2014.

During 2014, the two active employees with the largest potential death benefits both retired. One of those employees chose an Option 3 benefit and the other employee's benefit is no longer limited. Consequently, our current review of the fund as of December 31, 2014 and our fund balance projections through December 31, 2016 indicated that, once again, as we observed in the two preceding reviews, a lower level of funding will suffice for the fiscal year beginning July 1, 2015. Therefore, we recommend a contribution rate of 0.01 percent of payroll for the fiscal year beginning July 1, 2015.

Most of the individual participant benefits payable from the Benefits Completion Plan fund are relatively small and predictable. However, as noted above, substantial benefits have become payable, and will continue to be possible, as a result of the deaths of current and potential

participants. Table 3 below shows that 2 individuals have potential death benefits of \$1,000,000 or greater. The two largest potential death benefits total \$2,200,000. Both individuals are still active employees.

<b>TABLE 3</b> Potential Death Benefits of \$1 million or more Payable from the Benefits Completion Plan in 2016	
Employee A	\$1,100,000
Employee B	1,100,000

Based on the projected long-term cost of the Benefits Completion Plan, Hay Group and SERS developed the following policy for establishing future contributions. In general, the contribution should be set at the rate needed to build and maintain a fund sufficient to pay the two largest potential death benefits.

Therefore, the employer contribution to the Benefits Completion Plan Trust Fund is the contribution for the year beginning July 1, 2015 that, together with the projected fund assets, will be sufficient to fund all annuity benefits expected to be payable through December 31, 2016, plus the two largest potential death benefits.

Table 4 below shows the projection of the fund balance if a 0.01 percent contribution rate is implemented for both the 2015-2016 and 2016-2017 fiscal years. The table shows the projection through December 31, 2016 since the contribution needs to be sufficient to fund the benefits through 2016. The projection was made beginning with the current assets and projections using the actuarial assumptions described above. The retirement benefits are assumed to begin on January 1. Table 4 shows a prorated share of the death benefit.

The fund at the end of each period is equal to:

1. The fund at the end of the prior period, plus
2. Contributions, less
3. Retirement and death benefits, less
4. Expenses, plus
5. Investment earnings on the fund

The retirement benefits are those projected for the period using the stated assumptions. The death benefits reflect actual benefits currently payable, plus other potential death benefits that are projected using the stated assumptions. Given the low probability for each potential death benefit, the actual benefits could be zero or could be much higher if one or more of the potential \$1,000,000 (or greater) death benefit participants were to die.

<b>TABLE 4</b> Projected Benefits Completion Plan Trust Fund Balance June 30, 2015 Through December 31, 2016						
Time Period	Contributions +	Retirement Benefit Payments -	Death Benefit Payments -	Expenses -	Interest +	Ending Balance
As of December 31, 2014 (from Table 2 above)						\$4,868,979
January 1, 2015 – June 30, 2015	\$839,763	\$694,096	\$48,670	\$10,000	\$0	4,955,977
July 1, 2015 – December 31, 2015	301,084	694,096	48,670	10,000	0	4,504,296
January 1, 2016 – June 30, 2016	301,084	731,793	55,806	10,000	0	4,007,781
July 1, 2016 – December 31, 2016	310,267	731,793	55,806	10,000	0	3,520,450

Note: Some calculation results above may differ slightly due to rounding.

Table 4 above shows the result of the implementation of a 0.01 percent of payroll contribution for the 2015-2016 and 2016-2017 fiscal years. The resulting fund will be more than sufficient to fund the expected benefits using the actuarial assumptions as to the probability of retirement and mortality, and in accordance with the funding policy stated above. Barring further pre-retirement deaths from among those eligible for large death benefits during 2015 or 2016, by December 31, 2016, the fund will be sufficient to pay the two largest death benefits, plus there will be over \$1,300,000 of additional funds on hand to cover other potential obligations.

**Current and Potential Retired Participants**

An annuitant covered by SERS is eligible to participate in the Benefits Completion Plan if the annuitant is receiving a retirement benefit from the Defined Benefit Plan that is limited by IRC Section 415(b).

Each year, as of the valuation date, the current participants in the Benefits Completion Plan are evaluated to determine if they should be included in the Benefits Completion Plan for the following year. Participants of the Benefits Completion Plan would not be eligible to continue to participate if their retirement benefit were no longer limited by IRC Section 415(b). This situation could occur if the IRC Section 415(b) limit was increased and the total benefit due to the annuitant was paid out of the Defined Benefit Plan.

*Current Retired Participants*

As of the valuation date of December 31, 2014, there were 23 participants in the Benefits Completion Plan when reflecting the 415(b) limit effective January 1, 2015. These 23 participants will remain participants in the Benefits Completion Plan unless and until the IRC

Section 415(b) limit is increased to the point that the benefit payable to them from the Defined Benefit Plan is not limited.

<b>TABLE 5</b>			
Benefits Completion Plan			
Current Retired Participants as of December 31, 2014			
Age Group	Number	Annual Retirement Benefit	Potential Death Benefit
Less than 65	5	\$88,561	\$303,513
Older than 65	18	1,241,836	2,162,116
Total	23	\$1,330,397	\$2,465,629

*Potential Retired Participants*

In addition to determining the liability for currently retired participants of SERS and their survivors and beneficiaries, it is necessary to project benefits for potential participants in the Benefits Completion Plan. Potential participants are currently active employees of SERS who could retire before the end of the next calendar year with benefits limited by IRC Section 415(b).

For purposes of the actuarial valuation, potential participants in the Benefits Completion Plan were selected by SERS staff as those who had at least five years of credited service as of December 31, 2014 and whose Single Life Annuity as of December 31, 2014 was more than 90 percent of the age-adjusted IRC Section 415(b) limit.

These selection criteria resulted in a set of 43 employees who might receive benefits from the Benefits Completion Plan. We reviewed the selection criteria and agree that these criteria were reasonable to select all potential participants likely to receive benefits before December 31, 2015. Further, our calculation of the exact benefit for these 43 employees showed most with small or zero benefits from the Benefits Completion Plan. This confirmed our assumption that the criteria were broad enough to identify all potential participants. Table 6 shows the potential benefits as of December 31, 2014 for the 17 employees who could have received a benefit if they had retired at that point. The other 26 employees would have received no benefit if they retired.

<b>TABLE 6</b>		
Benefits Completion Plan		
Current Active Employees who are Potential Participants		
As of December 31, 2014		
Age Group	Count	Annual Benefit
< 50	0	0
50 – 54	2	87,348
55 – 59	2	22,879
60 – 64	6	107,447
65 and older	7	62,546
Total	17	\$280,220

**Appendix**

**Example 1: Lump Sum Death Benefit Payable from Benefits Completion Plan for a Participant Who Dies in Service**

<b>A.</b>	Maximum single life annuity.	\$215,000
<b>B.</b>	IRC Section 415(b) limit.	210,000
<b>C.</b>	Retirement benefit payable from the SERS Defined Benefit Plan, if the participant had retired, limited by IRC Section 415(b) limit. (lesser of A. and B.)	210,000
<b>D.</b>	Death benefit payable from the SERS Defined Benefit Plan is the present value of the benefit payable from the SERS Defined Benefit Plan (8.0 times C).	1,680,000
<b>E.</b>	Retirement benefit payable from the Benefits Completion Plan, if the participant had retired. (difference between A. and C., but not less than \$0)	5,000
<b>F.</b>	Death benefit payable from the Benefits Completion Plan is the present value of the benefit payable from the Benefits Completion Plan (8.0 times E).	40,000

Because the participant's accrued retirement benefit is in excess of the Section 415(b) limit, a death benefit will be paid from the Benefits Completion Plan in addition to the death benefit payable from the SERS Defined Benefit Plan. The death benefit payable from the SERS Defined Benefit Plan (Line D) is the present value of the retirement benefit limited by the IRC Section 415(b) limit. The death benefit payable from the Benefits Completion Plan (line F) is the present value of the retirement benefit payable from the Benefits Completion Plan. The examples use an actuarial present value factor of 8.0.

Example 2: Lump Sum Death Benefit Payable from the Benefits Completion Plan for a Participant Who Dies After Retirement under Option 1

<b>A.</b>	Benefit payable to the participant based on option selected.	\$215,000
<b>B.</b>	100 percent of pay limit.	170,000
<b>C.</b>	Retirement benefit payable from the SERS Defined Benefit Plan, limited by 100 percent of pay. (lesser of A. and B.)	170,000
<b>D.</b>	IRC Section 415(b) limit.	210,000
<b>E.</b>	Retirement benefit payable from the SERS Defined Benefit Plan. (lesser of C. and D.)	170,000
<b>F.</b>	Retirement benefit payable from the Benefits Completion Plan. (difference between C. and E., but not less than \$0)	0
<b>G.</b>	Annual annuity over the 100 percent of pay limit. (difference between A. and the sum of F. and E., but not less than \$0)	45,000
<b>H.</b>	Supplemental Death Benefit (Present value of annuity over the 100 percent of pay limit, assuming no Section 401(a)(9) limitation is applicable). (G. times 8.0)	360,000
<b>I.</b>	Additional annual annuity payable from the SERS Defined Benefit Plan if the 100 percent of pay limit was not applicable. (difference between D. and E.: the IRC Section 415(b) limit and the amount payable from the SERS Defined Benefit plan)	40,000
<b>J.</b>	Supplemental Death Benefit Payable from the SERS Defined Benefit Plan. (Present value of the annual annuity payable from the SERS Defined Benefit Plan if the 100 percent of pay limit was not applicable, assuming that no Section 401(a)(9) limit is applicable.) (I. times 8.0)	320,000
<b>K.</b>	Annual annuity payable from the Benefits Completion Plan if the 100 percent of pay limit was not applicable. (difference between G. and I. but not less than \$0)	5,000
<b>L.</b>	Supplemental Death Benefit Payable from Benefits Completion Plan (K. times 8.0)	40,000

The Supplemental Death Benefit payable from the Benefits Completion Plan is the present value of the difference between the benefit payable to the participant if the 100 percent of pay limit did not apply (line A = \$215,000) and the IRC Section 415(b) limit (line D = \$210,000). If the actuarial present value factor is 8.0, the lump sum death benefit would be \$40,000.

Example 3: Monthly Survivor Benefit Payable from the Benefits Completion Plan for a Participant Who Dies After Retirement under an Option 2 Retirement Benefit

<b>A.</b>	Benefit payable to the participant assuming an Option 2 was chosen.	\$215,000
<b>B.</b>	100 percent of pay limit.	220,000
<b>C.</b>	Retirement benefit payable from the SERS Defined Benefit Plan, limited by 100 percent of pay. (lesser of A. and B.)	215,000
<b>D.</b>	IRC Section 415(b) limit, assuming participant named spouse as survivor annuitant.	210,000
<b>E.</b>	Retirement benefit payable from the SERS Defined Benefit Plan, limited by IRC Section 415(b) limit. (lesser of C. and D.)	210,000
<b>F.</b>	Retirement benefit payable from the Benefits Completion Plan. (difference between C. and E., but not less than \$0)	5,000
<b>G.</b>	Full survivor benefit. (100 percent of A.)	215,000
<b>H.</b>	Survivor benefit payable from the SERS Defined Benefit Plan after the death of the participant, based on Option 2 benefit. (100 percent of E.)	210,000
<b>I.</b>	Survivor benefit payable from the Benefits Completion Plan, after the death of the participant, based on Option 2 benefit. (difference between G. and H.)	5,000

Example 4: Monthly Survivor Benefit Payable from the Benefits Completion Plan for a Participant Who Dies After Retirement under an Option 3 Retirement Benefit

<b>A.</b>	Benefit payable to the participant assuming an Option 3 was chosen.	\$211,000
<b>B.</b>	100 percent of pay limit.	215,000
<b>C.</b>	Retirement benefit payable from the SERS Defined Benefit Plan, limited by 100 percent of pay. (lesser of A. and B.)	211,000
<b>D.</b>	IRC Section 415(b) limit, assuming participant named spouse as survivor annuitant.	210,000
<b>E.</b>	Retirement benefit payable from the SERS Defined Benefit Plan, limited by IRC Section 415(b). (lesser of C. and D.)	210,000
<b>F.</b>	Retirement benefit payable from the Benefits Completion Plan. (difference between C. and E., but not less than \$0)	1,000
<b>G.</b>	Full survivor benefit. (50 percent of A.)	105,500
<b>H.</b>	Survivor benefit payable from the SERS Defined Benefit Plan after the death of the participant, based on Option 3 benefit. (50 percent of A.)	105,500
<b>I.</b>	Survivor benefit payable from the Benefits Completion Plan, after the death of the participant, based on Option 3 benefit. (difference between G. and H.)	0

Because the survivor benefit payable from the Defined Benefit Plan without regard to the IRC Section 415(b) limit is less than the IRC Section 415(b) limit, no benefit is paid from the Benefits Completion Plan after the participant's death.





**Report on 17th Investigation of  
Actuarial Experience:  
(2006 through 2010)**

January 12, 2011

# Commonwealth of Pennsylvania State Employees' Retirement System 17th Investigation of Actuarial Experience

January 1, 2006 to December 31, 2010

**HayGroup®**



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**Seventeenth Investigation of Actuarial Experience of the State Employees’  
Retirement System of the Commonwealth of Pennsylvania  
Review of Experience from January 1, 2006 to December 31, 2010**

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## I. Introduction & Executive Summary

### Introduction

This is the seventeenth in a series of investigations of actuarial experience for the State Employees' Retirement System (SERS) for the Commonwealth of Pennsylvania. This report is based upon economic and demographic experience from January 1, 2006 through December 31, 2010. A periodic review of actuarial experience is essential if a retirement system is to be financed on a sound basis. The Commonwealth has formally recognized this need in Section 5902(j) of the State Employees' Retirement Code:

The board shall have the actuary make an annual valuation of the various accounts within six months of the close of each calendar year. In the year 1975 and in every fifth year thereafter the board shall have the actuary conduct an actuarial investigation and evaluation of the system based on data including the mortality, service, and compensation experience provided by the board annually during the preceding five years concerning the members and beneficiaries. The board shall by resolution adopt such tables as are necessary for the actuarial valuation of the fund and calculation of contributions, annuities and other benefits based on the reports and recommendations of the actuary.

A retirement system operates on a sound actuarial basis when the funds on hand together with the expected future contributions are sufficient to cover the value of future promised benefit payments. Each year the actuary projects the expected value of future benefits and the stream of contributions needed to meet the benefit payments. The projection serves as a basis for the determination of the needed employer contributions to the retirement fund. The projection is based on a wide variety of economic assumptions, such as assumed investment returns, and demographic assumptions, such as rates of mortality. Since both the economic and demographic experience change over time, it is essential to conduct a periodic review of the experience and to adjust the assumptions in the valuation to take into account the most recent experience as well as the actuary's expectations for the future.

Economic assumptions include the rates of investment return and salary growth. Both the nominal investment return and salary growth are affected by the general rate of inflation. In periods of low inflation, salary increases will typically be smaller, with a greater emphasis on promotions and longevity, whereas in times of rapid price increases, salary increases will be larger, to keep pace with salaries of other employers competing for talent, and to maintain purchasing power. The development of these rates therefore includes an investigation of the underlying inflation and expectations for future inflation. These relatively few rates, compared to the large number of demographic assumptions, have the most significant effect on the estimate of future contributions. General economic forces, instead of the specific experience of the retirement system, are often given more consideration when setting an investment return, or salary growth assumption.

Demographic assumptions include the set of rates that predict certain events occurring to a group of employees or annuitants. Events of significance to a retirement system are those that result in a commencement or termination of a benefit payment. The events affecting active employees include reasons for leaving the system such as retirement, becoming disabled, terminating service, or death. The

events affecting annuitants include death. If an annuitant would return to service, or if a disabled annuitant were to recover from disability, the benefit payments to the annuitant would stop. However, these events are not included in the analysis because the occurrences of these events are rare, and would not materially affect the calculation of the decrement rates.

It is general practice to introduce some degree of conservatism in setting actuarial assumptions. However, the degree of conservatism varies widely among pension plans. Some plans set assumptions so that the pension plan contributions will be at least as great as the contributions needed in the most adverse foreseeable circumstances. Other systems set assumptions that are close to the actual experience but conservative enough to protect against small deviations from past experience. The latter, a moderately conservative approach, has been used by the SERS Board and the recommended rates in this evaluation were developed on that basis.

The Actuarial Standards Board has issued standards (Actuarial Standards of Practice or ASOPs) on the selection of demographic and economic assumptions. These standards are revised from time to time to address emerging practice. Since the previous experience study, the ASOP covering the selection of demographic assumptions (ASOP 35) has been revised and reissued. The primary reason for the revision (the main standard was issued in 1999) was to include an explicit recognition the actuary should give to the selection of the mortality assumption, given improvements in life expectancy, and a requirement for the actuary to explicitly disclose the mortality improvement assumption. This issue is addressed explicitly in the section discussing mortality.

- Section II of this report provides background information relating to this actuarial experience investigation.
- Section III presents the results of the review of the economic experience and discusses the basis for the recommended economic assumptions.
- Section IV presents the results of the analysis of the demographic experience, and the basis for the recommended demographic assumptions.
- Section V presents the results of other experience analyses we have performed (such as option form election rates) and our conclusions regarding the related actuarial assumptions.
- Section VI provides an overview and final commentary on Hay Group's recommendations.
- Section VII sets out considerations in the selection of assumptions for employees subject to the provisions of Act 120.
- Section VIII provides the Actuarial Certification for the report.
- Section IX defines certain terms used in this report.
- A full set of our recommended assumptions is included in the tables in the Appendix.

The following Executive Summary provides an overview of Hay Group's findings and recommendations.

## Executive Summary

The specific objective of this analysis is to develop economic and demographic assumptions as to the expected experience of the System. In general, it is good actuarial practice to select the actuarial valuation assumptions taking into account the System’s actual experience.

## Economic Experience

The most important set of rates in the valuation is the set of economic assumptions that include the prediction of future rates of investment return and general salary increases. The assumed rates of investment return and general salary increases are both driven by the underlying rate of inflation. Based upon our analysis of SERS’ past economic experience and our expectations for the future (as discussed in detail in Section III of this report), we recommend that:

- The current investment return assumption of 8.0 percent per year (compounded annually) be continued,
- The current inflation assumption of 3.0 percent per year be reduced to 2.75 percent per year,
- Consistent with the 0.25 percent change in inflation, the current general salary increase assumption of 3.3 percent per year be reduced to 3.05 percent per year and
- The current career salary increase assumptions (which vary by length of service) be reduced by varying amounts depending upon the employee’s length of service at all service levels.

Table I-1 below shows, for the first three recommendations listed above, (i) Hay Group’s recommended assumptions, (ii) the current assumptions, which have now been in use for the past two actuarial valuations (2008 and 2009), and (iii) the prior assumptions, which were utilized for the preceding thirteen years of actuarial valuations (from 1995 through 2007).

<b>Table I-1 Recommended vs. Current vs. Prior Economic Assumptions</b>					
	<b>Annual Inflation</b>	<b>Investment Return</b>		<b>Salary Growth</b>	
		<b>Nominal</b>	<b>Real<sup>1</sup></b>	<b>Nominal</b>	<b>Real<sup>1</sup></b>
<b>Recommended</b>	2.75%	8.00%	5.1%	3.05%	0.3%
<b>Current 2008 &amp; 2009</b>	3.00%	8.00%	4.9%	3.30%	0.3%
<b>Prior 1995 – 2007</b>	3.00%	8.50%	5.3%	3.30%	0.3%

For the specific service-related reductions we are recommending the career salary increase assumptions, per the fourth recommendation listed above, as set out in Table A-1 in the Appendix.

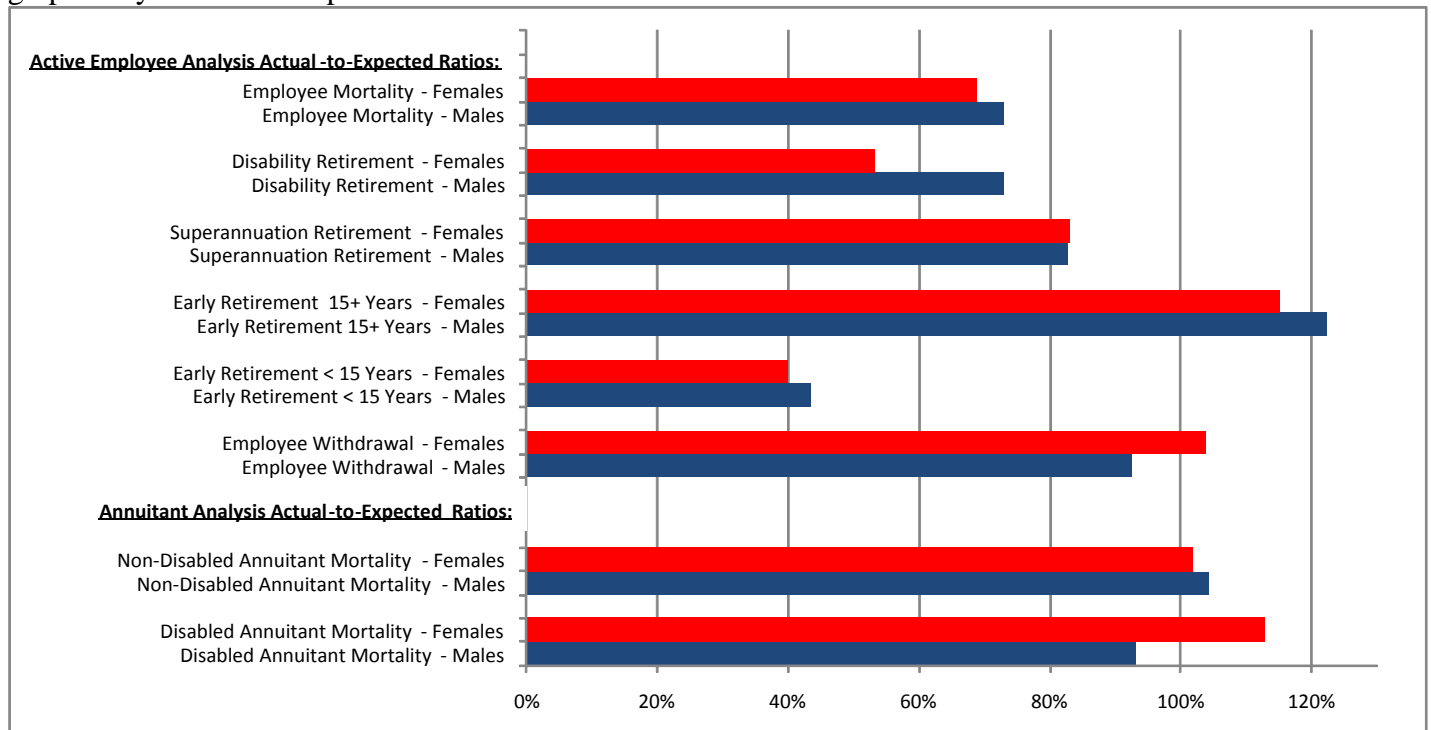
<sup>1</sup> The real investment return and real salary growth rate are determined using the formula  $(1+real) = (1+nominal)/(1+inflation)$ . The rates shown are annual rates.

## Demographic Experience

Development of demographic actuarial assumptions begins with the analysis of actual experience to expected experience, and the calculation of the actual-to-expected ratio. The actual-to-expected ratio gives a measure of how closely the assumption predicted what actually happened. If the actual-to-expected ratio is greater than 1.0, then the actuarial assumption under-predicted; if the actual-to-expected ratio is less than 1.0, then the assumption over-predicted the number of occurrences. The product of the analysis is a set of recommended actuarial assumptions that produce an actual-to-expected ratio close to 1.0, based on actual experience, unless circumstances warrant a deviation.

The analysis was performed separately for each category of membership expected to have unique patterns of termination experience. The Class AA and Class A general employees comprise over 80 percent of the membership of SERS. The remaining 20 percent comprise the State Police, members of the General Assembly, members of the judiciary, and other members eligible to retire at age 50.

The actual-to-expected ratios for our Class AA and Class A general employee analyses are shown graphically below in Graph I-1.



## Demographic Experience Observations and Assumption Recommendations

In general and as indicated in Graph I-1, the experience was close to expected for annuitant mortality (both disabled and non-disabled) as well as for employee withdrawal. Experience was lighter than expected for employee mortality (i.e., in-service deaths) as well as disability retirements. With regard to retirement, we saw heavier than expected early retirement among employees with 15 or more years of service and much lighter than expected early retirement among employees with less than 15 years of service. Lastly, superannuation retirement experience was lighter than expected, with significant variation by year.

As a result of the above observations, Hay Group is recommending the following demographic assumption changes:

- With respect to the assumptions applicable to all active employees:
  - Decreases in the mortality rates for females and males for most ages over age 49; increases in the rates for males at all ages under age 50 (See Table A-2)
  - Significant decreases in the disability retirement rates for both females and males at all ages (See Table A-3)
- With respect to the assumptions applicable to Class AA and Class A general employees:
  - Decreases in the superannuation rates for both females and males at almost all ages (See Table A-4)
  - Increases in the early retirement rates for those with 15 or more years of service for both females and males at most ages over 50; decreases in the early retirement rates for those with 15 or more years of service for both females and males at all ages under 51 (See Table A-5)
  - Significant decreases in the early retirement rates for those with fewer than 15 years of service for both females and males at most ages (See Table A-6)
  - Increases in the employee withdrawal rates for females and males at younger ages and shorter service durations; and decreases in the withdrawal rates at longer-service durations (See Table A-7)
- With respect to the assumptions applicable to annuitants and survivors:
  - Decreases in the non-disabled annuitant and survivor mortality rates for both females and males at most ages 55 through 94 (See Table A-8)
  - Increases in the disabled annuitant mortality rates for females at all ages; decreases in the disabled annuitant mortality rates for males at all ages (See Table A-9)

Hay Group also studied the 2006-2010 demographic experience of employees in special benefit classes, leading to the following additional demographic assumption recommendations:

- With respect to the superannuation rates applicable to active State Police, increases in the superannuation rates for both females and males at all service levels (See Table A-10)
- With respect to the superannuation assumptions applicable to active Hazardous Duty Employees, other than State Police, increases in the superannuation rates for both females and males at ages 59-61; decreases in the superannuation rates for both females and males at ages over 61 (See Table A-11)



- With respect to the assumptions applicable to active State Police and other Hazardous Duty Employees:
  - Decreases in the early retirement rates for both females and males (See Table A-12)
  - Decreases in the employee withdrawal rates for females and males at all service levels except during the first year of service, for which an increased rate is recommended (See Table A-13)
- With respect to the assumptions applicable to active Legislators:
  - Significant increases in the superannuation rates for both females and males at all ages (See Table A-14)
  - Slight decreases in the early retirement rates for both females and males at all ages (See Table A-15)
  - Increases in the employee withdrawal rates for females and males at all service levels (See Table A-16)
- With respect to the assumptions applicable to active Judicial Officers:
  - Significant increases in the superannuation rates for both females and males at all ages over 58 (See Table -17)
  - Significant increases in the early retirement rates for both females and males at all ages (See Table A-18)
  - Increases in the employee withdrawal rates for females and males at all service levels (See Table A-19)

For the specific age-related or service-related assumption changes we are recommending, as listed above, generally including a comparison versus the current assumptions, see the tables referenced above in the Appendix to this report. For a table of contents listing all 18 rate tables included in the Appendix, see the first page of the Appendix.

## II. Background

The specific objective of this actuarial investigation is the development of the following assumptions as to the expected experience of the System:

- the investment return of the fund;
- the rates of salary increase among active members;
- the rates of mortality among active members and annuitants;
- the rates of disability among active members;
- the rates of superannuation retirement among active members;
- the rates of separation for other reasons among active members.

The analysis was performed separately for each category of membership expected to have unique patterns of termination experience:

- Class AA and Class A general employees eligible for full benefits at age 60 or with 35 years of service;
- State Police;
- other hazardous duty employees eligible to retire at age 50;
- members of the General Assembly;
- members of the judiciary.

The Class AA and Class A general employees comprise over 80 percent of the membership of SERS.

### Age and Service Requirements for Superannuation (full formula benefits)

#### Class AA & Class A

General Conditions	Age 60 with three years of service; or 35 or more years of credited service, regardless of age.
Legislators and certain enforcement officers	Age 50 with three years of service.
Park Rangers & Capitol Police	Age 50 with 20 years of Park Ranger or Capitol Police service.
State Police	Age 50. State Police are eligible for special unreduced benefits after 20 years of service, regardless of age; however, age 50 remains their superannuation age.

#### Class C

State Police	Age 50. State Police are eligible for special unreduced benefits after 20 years of service, regardless of age; however, age 50 remains their superannuation age.
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Other Hazardous Duty

Age 50 with three years of service.

Class D-3 & Class D-4 Legislators

Age 50 with three years of service.

Class E-1 & Class E-2 Judges

Age 60 with three years of service; or 35 or more years of credited service, regardless of age.

### III. Analysis of Economic Experience and Recommended Economic Assumptions

The most important set of rates in the valuation is the set of economic assumptions that include the prediction of future rates of investment return and general salary increases. The assumed rates of investment return and general salary increases are nominal rates and are therefore developed from an assessment of the underlying rate of inflation.

Both the investment return and salary growth effect the valuation results. For the 2008 valuation the investment return rate was reduced from 8.50 percent to 8.00 percent, while there was no change made at that time to the salary growth rate. Changes in the investment return assumption effects all liabilities whereas changes in the salary scale only affect liabilities for current employees. If the salary increases are greater than expected, the benefits will grow in direct proportion because they are based on the final three-years' average salary. Conversely, a decrease in investment earnings will directly increase the employer contributions needed to pay the benefits. For SERS, an equal change in the two assumptions will change the normal cost and actuarial liabilities. For instance, decreasing both the investment return and salary growth assumptions by the same 0.5 percent will increase both the normal cost and the unfunded accrued liability.

The current assumptions and rates in effect from the prior experience investigation are shown in Table III-1. The assumed general salary growth does not include individual career salary increases, due to promotions and longevity. These increases are covered in a later section. The real rate of investment return and the real rate of salary growth are derived by dividing the nominal rates by the rate of inflation. (For example, the real investment return is  $[1.08 / 1.03] - 1.0$ , which is approximately 4.9%).

<b>Table III-1 Current Economic Assumptions</b>					
	<b>Annual Inflation</b>	<b>Investment Return</b>		<b>Salary Growth</b>	
		<b>Nominal</b>	<b>Real</b>	<b>Nominal</b>	<b>Real</b>
<b>Current 2008 &amp; 2009</b>	3.00%	8.00%	4.9%	3.30%	0.3%
<b>Prior 1995 – 2007</b>	3.00%	8.50%	5.3%	3.30%	0.3%

Table III-2 below shows the rate of inflation, the nominal and real investment return based on the market value of assets and the nominal and real salary growth for the past twenty years. The rate of inflation is based upon the Consumer Price Index for all Urban Consumers (CPI-U), the U.S. City Average. The annual rate of inflation is calculated as the change in the index from December of the previous year to December of the current year. For example, the CPI-U for December of 2004 was 190.3 and the CPI-U

for December of 2005 was 196.8, which resulted in an annual inflation for 2005 of 3.4 percent  $[(196.8/190.3) - 1 = 3.4\%]$ .

**Table III-2**  
**Annual Rates of Growth**

Year	Inflation	Investment Return		Salary Growth	
		Nominal	Real	Nominal	Real
1990	6.1	1.0	(4.8)	5.0	(1.0)
1991	3.1	22.6	19.0	1.0	(2.0)
1992	2.9	7.4	4.4	2.1	(0.8)
1993	2.7	13.2	10.2	5.1	2.3
1994	2.7	(1.1)	(3.7)	3.9	1.2
1995	2.5	25.2	22.1	3.8	1.2
1996	3.3	15.9	12.2	2.0	(1.3)
1997	1.7	18.0	16.0	3.0	1.3
1998	1.6	16.3	14.5	3.0	1.4
1999	2.7	19.9	16.8	3.0	0.3
2000	3.4	2.2	(1.1)	3.0	(0.4)
2001	1.6	(7.9)	(9.3)	3.3	1.7
2002	2.4	(10.9)	(13.0)	3.5	1.1
2003	1.9	24.3	22.0	2.0	0.1
2004	3.3	15.1	11.4	1.9	(1.4)
2005	3.4	14.5	10.7	3.0	(0.4)
2006	2.5	16.4	13.6	3.5	1.0
2007	4.1	17.2	12.6	2.8	(1.2)
2008	0.1	(28.7)	(28.8)	3.0	2.9
2009	2.7	9.1	6.2	3.0	0.3
2010	1.1 <sup>2</sup>	5.0 <sup>3</sup>	Not Yet Available	Not Yet Available	Not Yet Available
<b>Averages</b>					
<b>2005-2009</b> (5 years)	<b>2.55</b>	<b>3.97</b>	<b>1.39</b>	<b>3.06</b>	<b>0.51</b>
<b>2000-2009</b> (10 years)	<b>2.53</b>	<b>3.84</b>	<b>1.29</b>	<b>2.90</b>	<b>0.36</b>
<b>1995-2009</b> (15 years)	<b>2.48</b>	<b>8.69</b>	<b>6.07</b>	<b>2.92</b>	<b>0.43</b>
<b>1990-2009</b> (20 years)	<b>2.73</b>	<b>8.59</b>	<b>5.71</b>	<b>3.04</b>	<b>0.31</b>

<sup>2</sup> November 2009 to November 2010

<sup>3</sup> January 1, 2010 through September 30, 2010

## Inflation

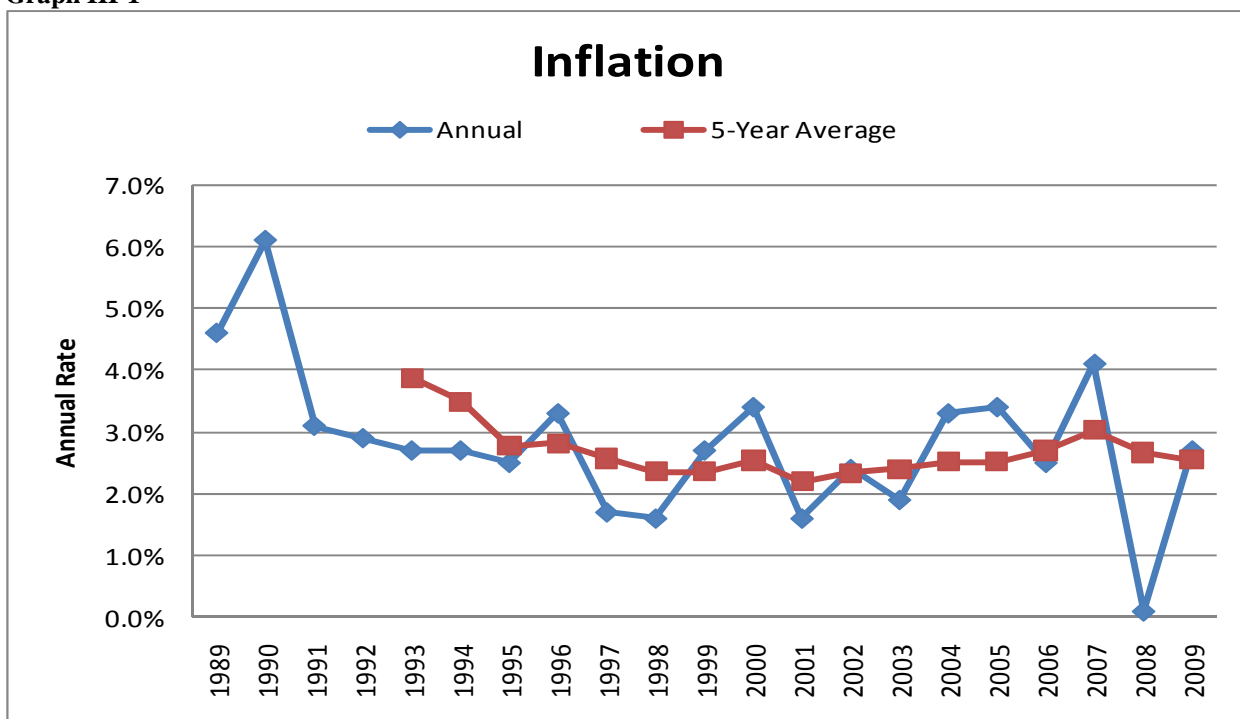
While inflation does not directly affect SERS liabilities or assets (as it would if automatic COLAs applied under SERS), it is an important consideration in our review of both the investment return and general salary increase assumptions. There has been a gradual decline in inflation in the United States, with the rolling five-year average staying below 3 percent for 14 of the past 15 years. The significant federal stimulus monies and expansionary monetary policies have prevented the US economy from entering a deflationary phase but are unlikely to lead to an increase in inflation in the long-term.

SERS investment advisors Rocaton, in their 2010 Long-Term Capital Market Forecast stated that their 10-year inflation forecast was 2.4 percent, based on the Livingston Survey of Professional Forecasters. While we have given some weight to this inflation forecast, it does not project far enough into the future for purposes of setting the inflation assumption for the valuation. The Social Security Administration, for purposes of cost projections included in their most recent annual Trustees' Reports (based upon their "intermediate assumptions"), projects that future annual inflation will be at a rate of 2.8 percent.

We believe, based upon historical inflation rates (as shown in Table III-2) and our current expectations for the future (giving appropriate consideration to the recent stimulus, monetary policy, and supportive points covered in the prior paragraph) that it is reasonable and appropriate to recommend lowering the anticipated annual inflation assumption from 3.0 percent to 2.75 percent.

While the annual inflation rate has ranged from a low of 0.1 percent to a high of 6.1 percent, the rolling 5-year average has ranged between 2.20 percent and 3.87 percent over the last 15 years.

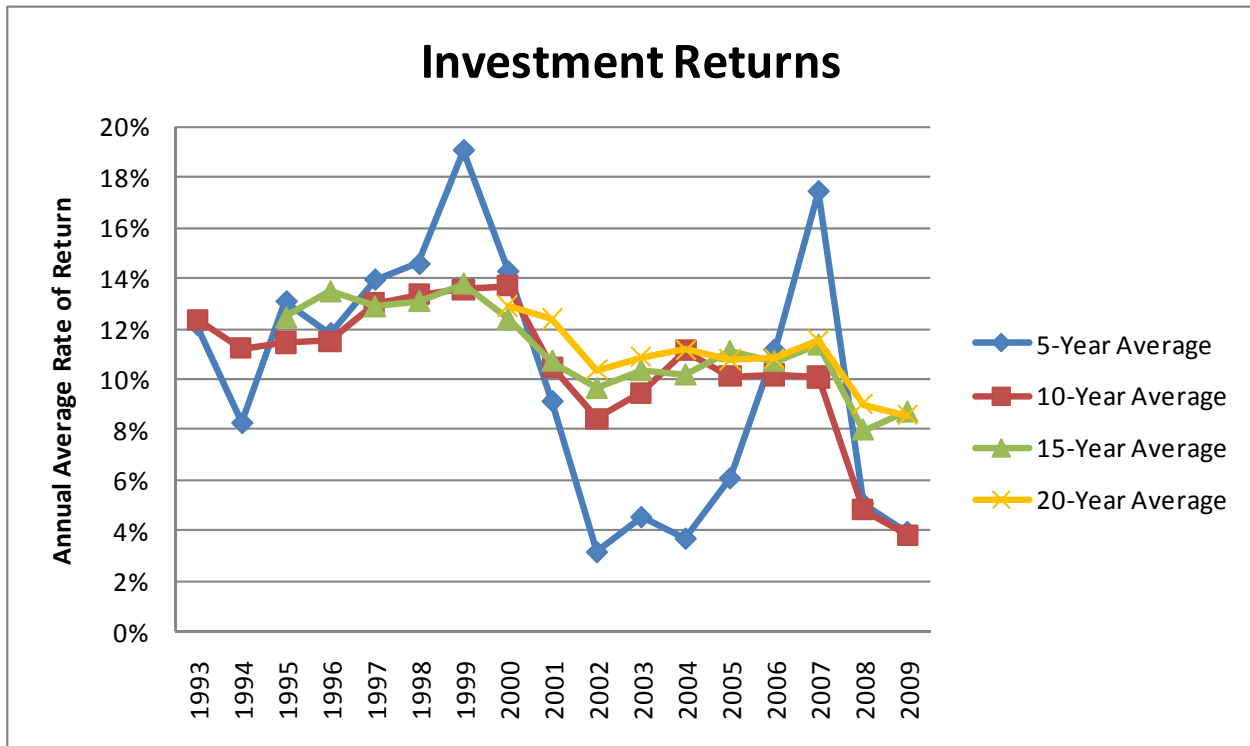
Graph III-1



## Investment Return

As shown in Table III-2, the 15-year and 20-year average annual rates of return were 8.7% and 8.6% respectively. The shorter-term averages over the last 5 and 10 years (4% and 3.8% respectively) were materially affected by the severe market decline of 2008.

Graph III-2



We believe that the analysis and investment projection support the continuation of an investment return assumption of 8.0 percent. In fact, given the higher investment returns during the past 15 to 20 years, an 8.0 percent assumption remains somewhat conservative.

This conclusion is supported by SERS' investment advisors, Rocaton Investment Advisors, who currently project that future investment returns on SERS assets will be 8.0 percent per year based on the target asset allocation. The current asset allocation includes a heavier weighting in alternative investments producing an expected return of 8.47 percent.

We believe that continuation of the 8.0 percent investment return assumption still affords SERS and the Board a sufficient and appropriate margin of conservatism considering that returns over the past fifteen to twenty years have averaged more than 8.0 percent (namely 8.7 percent over fifteen years and 8.6 percent over the past twenty years).

## Salary Experience

As the retirement benefit that SERS members receive is a final average salary based annuity, the salary increase assumption is a key valuation assumption. There are two components to the salary increase assumption: a general salary average assumption that applies to all employees at all ages and points in their career and a career salary increase assumption. The general salary increase would be the expected increase for a member remaining in the same job, whereas the career salary increase reflects pay increases due to promotions and longevity.

### General Salary Increase Assumption

The general salary increase assumption is the rate by which salaries are expected to increase each year. The assumption consists of an assumed inflation rate and an assumed real salary growth rate. The current assumptions are an assumed inflation rate of 3.0 percent and a real salary growth rate of 0.3 percent for a total of 3.3 percent. Consistent with our recommendation to reduce the long-term inflation assumption by 25 basis points, we recommend reducing the general salary increase assumption to 3.05 percent.

The recommended economic assumptions are shown in Table III-3

<b>Table III-3 Recommended Economic Assumptions</b>				
<b>Annual Inflation</b>	<b>Investment Return</b>		<b>Salary Growth</b>	
	<b>Nominal</b>	<b>Real</b>	<b>Nominal</b>	<b>Real</b>
2.75%	8.00%	5.1%	3.05%	0.3%



## Career Salary Increase Assumption

For the experience analysis, we reviewed individual pay for all members who were active in any consecutive pair of years from 2005 to 2009. The data was verified and a limited number of records were removed where the year over year pay either increased or decreased by more than 50 percent.

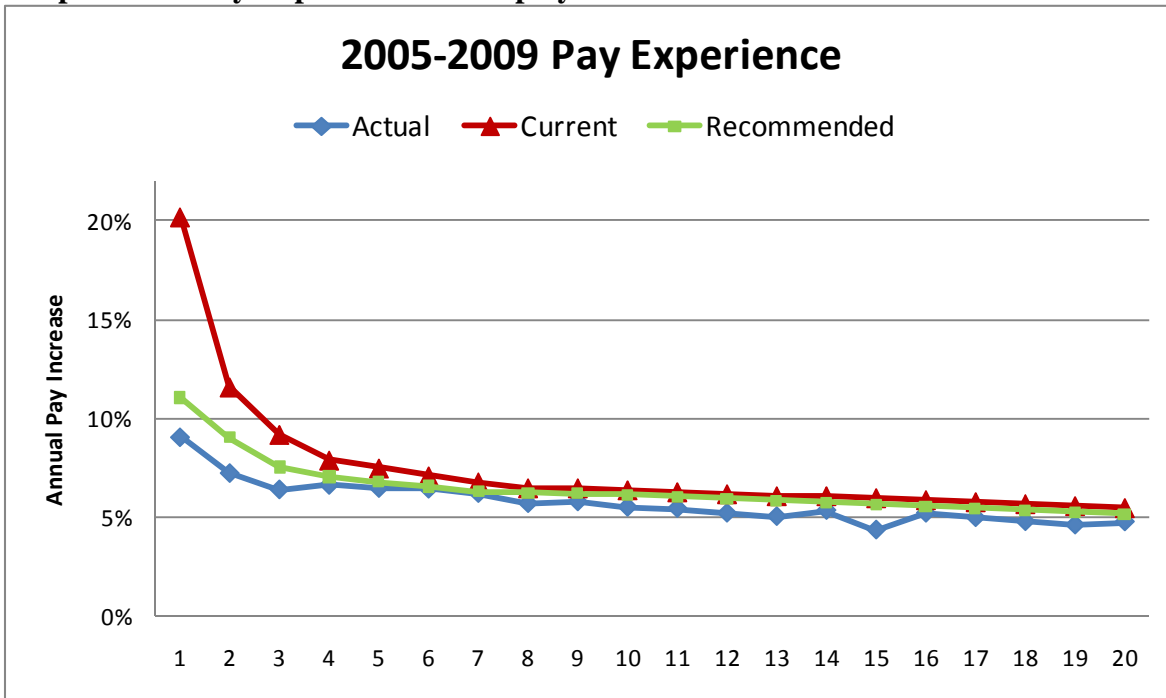
Three events affected the 2005-2009 salary increase experience. First, the period includes two years in which management employees had pay freezes: 2008 and 2009. Management employees comprise less than 20 percent of employees and total payroll. Second, one of the years included 27 pay periods, rather than the usual 26 pay periods, resulting in about a 4 percent higher salary for about half the employees. This event (27 pay periods in a year) will not occur in every experience study, so it is an infrequent event that should be taken into consideration. Third, as part of union negotiations, a one-time payment of \$1,250 was included in the first year of the contract in July 2007. We examined the year by year pay increases by size of increase as well as the number of members who received no increase and concluded that the net impact of these three events was generally neutral. Therefore, we concluded that the salary increase data could be used in aggregate without adjustment.

Graph III-3 shows the total pay experience for the experience period for the verified records for employees in their first 20 years of service and Graph III-4 shows the experience for employees with 20 to 40 years of service.

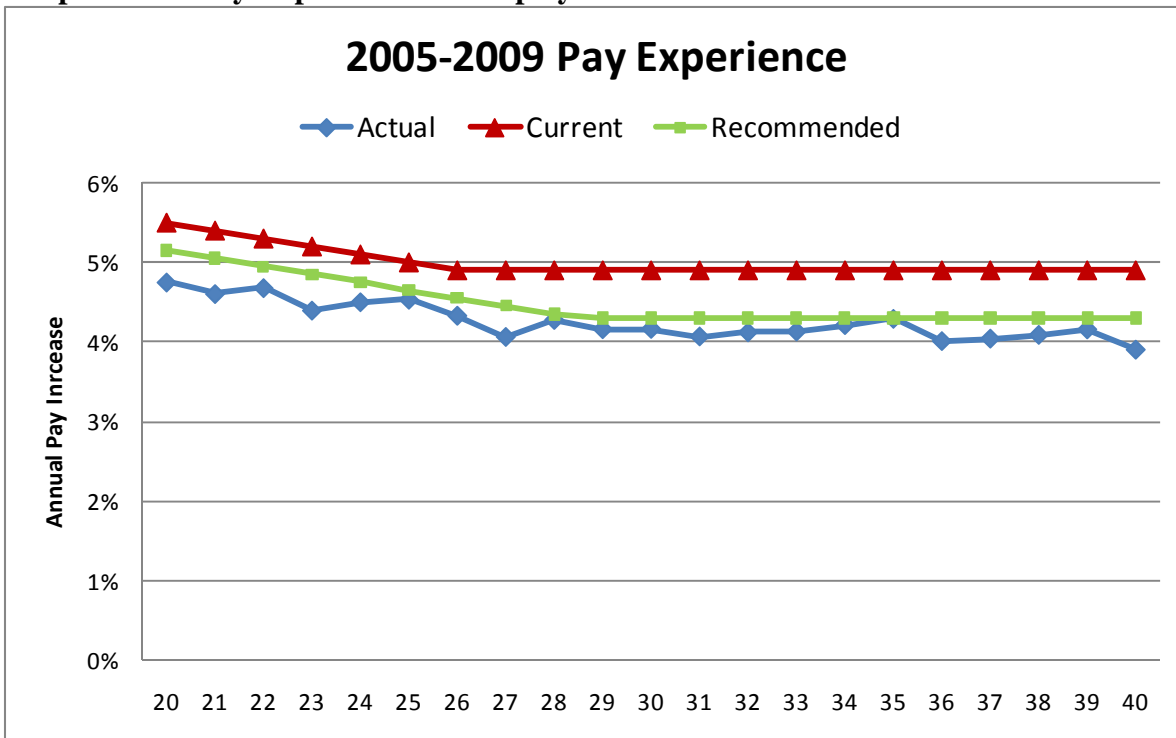
Graph III-3 shows that the pattern of higher increases in the first years of employment continues; however, the rate of increase was much lower than expected for those in their first three years of employment. The pattern of the actual salary increases otherwise conforms well with the pattern of the current assumption, with actual increases at least 0.75 percent lower than expected at all durations.

Graph III-4 shows the pattern of increases for employees with more than 20 years of service also conforms well with the valuation assumption, with the actual rate 0.75 percent lower on average at all durations.

**Graph III-3 – Pay Experience for Employees with less than 21 Years of Service**



**Graph III-4 – Pay Experience for Employees with 20 or more Years of Service**



Based upon our pay experience findings, as illustrated in Graphs III-3 and III-4, we recommend lowering the current career salary increase assumptions at all service levels. Our recommended career

salary increase rates are shown in Table A-1 in the Appendix. The table shows the actual 2005-2009 salary increase experience, the current total salary increase assumptions from general and career increases combined, the recommended total salary increase assumptions, the current career salary increase assumptions, and the recommended career salary increase assumptions.

## **IV. Analysis of Demographic Experience and Recommended Demographic Assumptions**

The terminations from active employment for SERS participants are analyzed by four categories depending on the eligibility for SERS benefits:

- Deaths
- Disabilities
- Superannuation retirements
- Other separations from active employment

The terminations are split by the categories above to calculate the long-term rates to be used for the valuation.

The following sections describe the analysis of the demographic experience and show the results of the actual-to-expected experience analysis. The first section discusses the analysis and results for active Class AA and Class A general employees subject to age 60 superannuation, and the second section discusses the results for employees subject to different retirement provisions. The different eligibility rules for retirement do not affect the probability of death or disability, so these rates are the same for all classes. The final section describes the actual-to-expected analysis for retirees and survivors.

Tables IV-1 through IV-6 below compare the actual terminations that have occurred in the 2006-2010 period to the expected results based on the current set of actuarial demographic assumptions used in the 2009 actuarial valuation. These actuarial demographic assumptions were based on the previous experience study. The actual-to-expected ratio is the actual terminations as a percent of the expected terminations. Total deaths among female employees, for instance, were 177, or approximately 69 percent of the 258 female employee deaths that would have been expected using the current valuation tables.

In general, we are recommending that the assumptions for the valuation for active employees be revised to more closely reflect the actual experience of the study period.

### **Analysis of Deaths**

Members who die while on active duty are eligible for a death benefit. If the member had less than 5 years of credited service, the member's accumulated contributions are returned. If the member was eligible to receive a retirement benefit, an eligible beneficiary or survivor will receive a benefit from SERS.

During the study period, there were 553 deaths. Based on the current assumptions, we would have expected 773 deaths during the 4 and a half year period. The resulting actual-to-expected ratio was 0.72. The long-term rates for death are calculated separately for males and females. Table IV-1 shows the actual deaths, expected deaths based on the current rates, and expected deaths based on the recommended rates. Mortality of the overall U.S. population continues to improve so it is not surprising that the actual deaths during this recent period are lower than expected.

We propose to adjust the current rates to produce an actual-to-expected ratio closer to 1.0. Unlike post-retirement mortality, lower mortality (fewer deaths) among active participants would reduce benefits. Therefore, the assumptions we are proposing are somewhat conservative.

**TABLE IV-1  
Employees Leaving Active Employment Because of Death**

	<b>Actual Deaths</b>	<b>Expected Deaths</b>	<b>Ratio Actual-to- Expected</b>	<b>Ratio with Recommended Rates</b>
	2006-2010	2006-2010	2006-2010	2011-2015
Female Deaths	177	258	69%	86%
Male Deaths	376	515	73%	90%
Total Deaths	553	773	72%	89%

## Analysis of Disability Retirements

A member is eligible for disability retirement if the member is unable to perform his or her current job and has at least 5 years of service. A State Police or enforcement officer does not have a service requirement.

The data on terminations included 1,333 disability retirements. However, 158 of those members were eligible for superannuation retirement based on their age and credited service at termination. Since there is no difference in benefit, we combined the disabled and non-disabled members who retire after superannuation into the superannuation rates. Therefore, the disability rates are based on the 1,175 members who became disabled before superannuation age.

The total number of disability retirement terminations included in this analysis was 1,175. We would have expected 2,178 disability retirements during the same period, based on the current assumptions. The actual disabilities were 39 percent fewer than expected. We recommend disability retirement rates that are closer to the actual experience of the disability retirements calculated separately for males and females. Table IV-2 shows the number of disability retirements, the expected disability retirements based on the current assumptions, the ratio of actual to expected based on the current assumptions, and the ratio based on the recommended rates.

**Table IV-2****Employees Leaving Active Employment for Disability Retirement**

	<b>Actual Disability Retirements</b>	<b>Expected Disability Retirements</b>	<b>Ratio Actual-to- Expected</b>	<b>Ratio with Recommended Rates</b>
	2006-2010	2006-2010	2006-2010	2011-2015
Female Disabilities	604	1,283	47%	86%
Male Disabilities	571	895	64%	85%
Total Disabilities	1,175	2,178	61%	85%

**Analysis of Superannuation Retirements – Class AA & Class A General Employees**

Class AA and Class A general employees can retire and receive full formula benefits after attaining superannuation age. Superannuation age is defined as age 60 with three years of service. Members of Class AA and Class A with 35 or more years of credited service are entitled to full formula benefits regardless of age. As mentioned under the disability retirement analysis, members who terminated on a disability retirement, but were eligible for unreduced benefits at the time of disability were treated as superannuation retirements and included in that part of the analysis.

Table IV-3 below shows the actual superannuation retirements compared to the expected superannuation retirements based on the current assumptions.

**Table IV-3****Employees Leaving Active Employment for Superannuation Retirement**

	<b>Actual Superannuation Retirements</b>	<b>Expected Superannuation Retirements</b>	<b>Ratio Actual-to- Expected</b>	<b>Expected with Recommended Rates</b>
	2006-2010	2006-2010	2006-2010	2011-2015
Female Retirements	5,146	6,109	84%	101%
Male Retirements	5,821	6,944	84%	94%
Total Retirements	10,967	13,053	84%	97%

The overall experience was a lower number of retirements than expected, which implies employees are retiring later. The experience was affected by the change in retiree healthcare cost-sharing, which resulted in a surge of retirements in 2007, as shown in Table IV-4.

**Table IV-4**

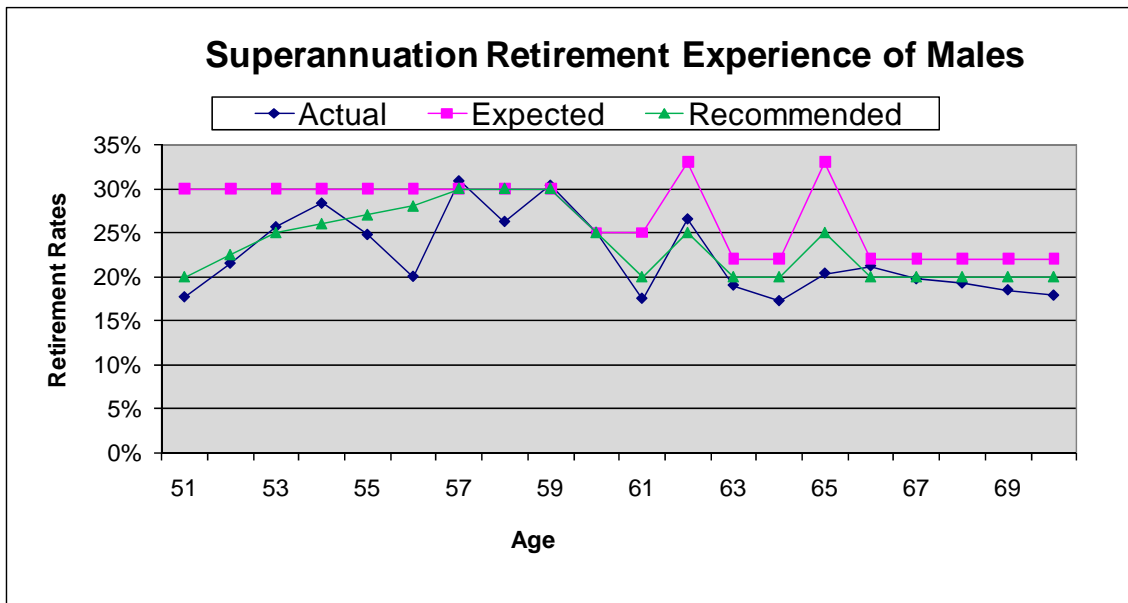
**Ratio of Actual to Expected Superannuation Retirements by Year**

Year	2006	2007	2008	2009	2010	Total
Ratio of Actual-to-Expected	57%	122%	61%	68%	112%	84%

The retirements in 2007 pulled forward some of the retirements that would have occurred in 2008 and later years. Although the 2010 experience only represents six months experience, it was slightly above the expected number. The retirement rates were adjusted to reflect the overall trend observed, with the 2007 surge pulling forward some retirements, against an overall trend of slightly lower rates of retirement at the earliest eligible ages and after age 60. The experience of female employees' retirement under age 60 is lighter than for males and a sufficiently different pattern to justify a separate set of rates.

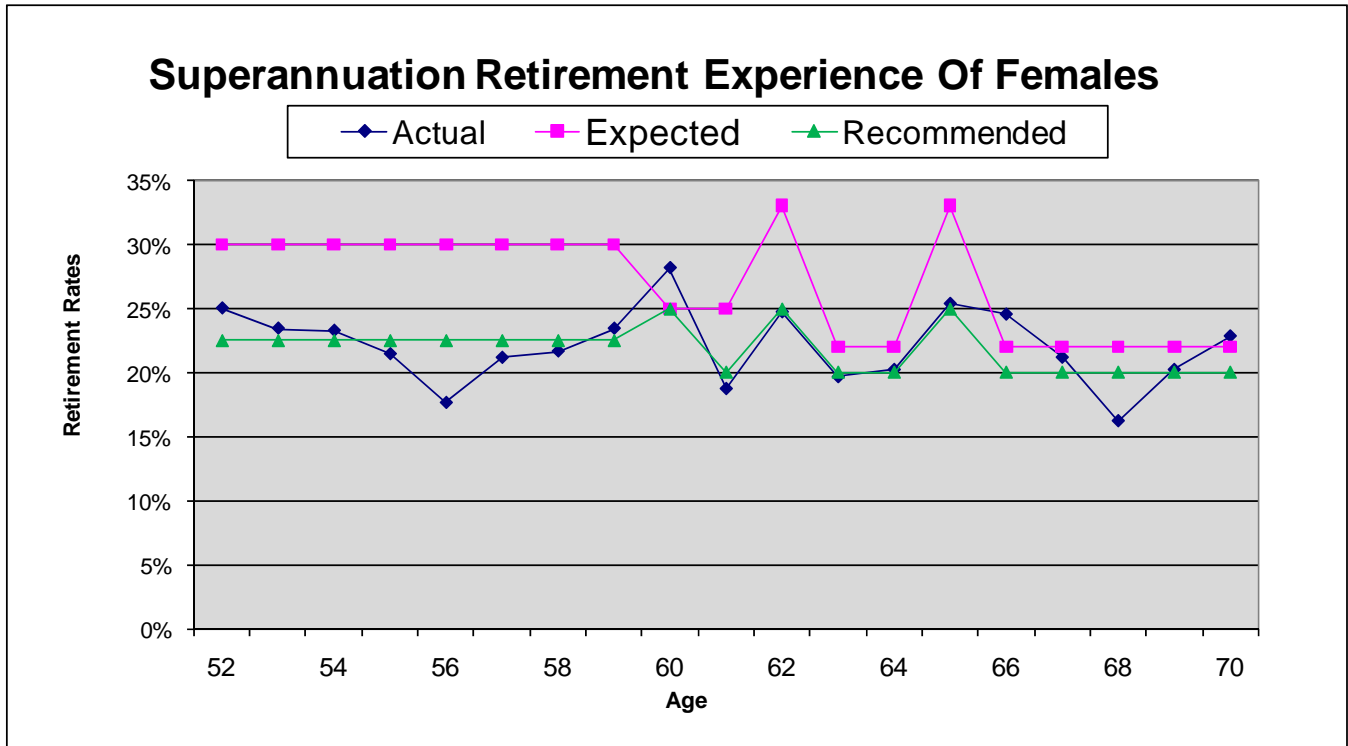
The following charts show the retirement experience by age at retirement. The current assumption was 30 percent for ages 51 through 59, higher rates at ages 62 and 65 (Social Security Early Retirement Eligibility and Medicare Eligibility respectively).

**Graph IV-1 – Male Superannuation Retirement Experience**



The observed retirement pattern for females was lighter than that for males for retirement before age 60. The difference between the male retirement experience and the female retirement experience is large enough to warrant separate rates for males and females. The recommended rates continue to anticipate a spike at ages 62 and 65.

**Graph IV-2 – Female Superannuation Retirement Experience**



The recommended rates for Superannuation Retirement for general employees are shown in the Appendix in Table A-4.



## **Analysis of Other Separations from Active Employment – Class AA & Class A General Employees**

Table IV-5 shows the ratio of actual to expected terminations for reasons other than death, disability or superannuation retirement. These rates would be expected to vary somewhat according to the economic cycle. Employees are more likely to continue with an employer in a tight job market.

Our valuation splits the other separations into three categories. These are (1) non-vested separations, (2) vested separations who take immediate early retirement benefits and (3) vested separations who defer their benefits until superannuation age. Non-vested separations are those who do not have five years of service upon separation. We examined those with more than five years of service and found that 74 percent of those with 5 to 14 years of service elected an immediate annuity and 84 percent of those with 15 or more years of service elected an immediate annuity. We recommend assuming that 75 percent of those with 5 to 14 years of service and all (100 percent) of those with 15 or more years of service will elect an immediate annuity. The current assumptions are 60 percent of those with 5 to 14 years of service and 100 percent of those with 15 or more years of service.

Our analysis also showed that the greater than expected number of early retirements with 15+ years of service was due primarily to the change in cost-sharing for retiree healthcare coverage. For employees who retired before July 1, 2005, the Commonwealth pays 100 percent of the cost. Commonwealth employees who retire on or after July 1, 2005 are required to pay retiree contributions as a condition of receiving retiree medical coverage. For employees who retired after June 30, 2005, and before July 1, 2007, the retiree contribution was set at 1 percent of the employee's final salary. Commonwealth employees who retire on or after July 1, 2007, are required to pay retiree contributions at the same rate as active employees, phased in as follows: 1 percent of employee's final salary for FY 2007-2008, 1.5 percent of final salary for FY 2008-2009, 2 percent of final salary for FY 2009-2010 and 3 percent of final salary thereafter.

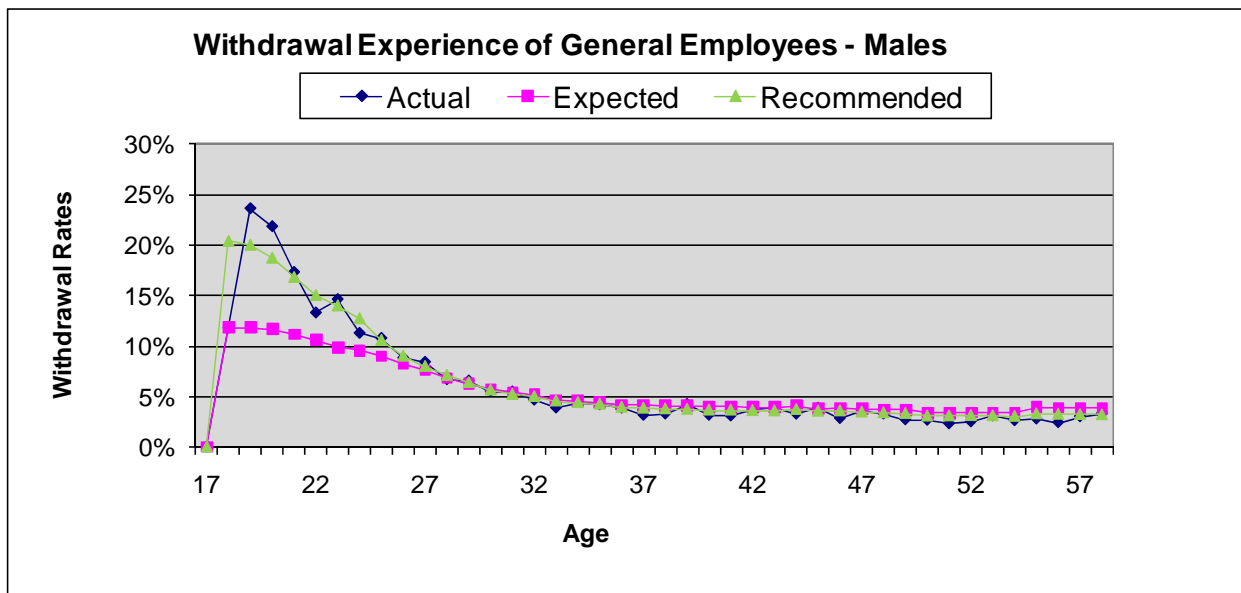
In addition to the introduction of higher retiree contributions, the eligibility for retiree healthcare benefits was lengthened. For employees (other than a defined group of "grandfathered employees"), eligibility for retiree medical benefits is restricted to employees who retire with 20 or more years of service.

**TABLE IV-5  
Other Separations From Active Employment**

	Actual Separations 2006-2010	Expected Separations 2006-2010	Ratio Actual-to-Expected 2006-2010	Ratio with Recommended Rates 2011-2015
Female Separations	9,568	10,574	0.90	1.02
Male Separations	8,564	9,548	0.89	0.93
Total Separations	18,132	20,122	0.90	0.97

The following charts show the withdrawal experience by age. The valuation assumptions include select and ultimate rates, that is higher expected rates of withdrawal in the early years of an employee’s career, reducing to an age-specific rate after seven to fifteen years, depending on age at hire. Both charts show the withdrawal experience at the younger ages was materially higher than expected. From age 30, the observed rates were at or slightly below the expected rates. During periods of economic downturn, voluntary termination rates are typically lower, as employees find fewer employment opportunities. We therefore do not recommend changes to the rates for longer service and at the older ages, but are proposing increases in the rates at the younger ages and early service years for both males and females.

**Chart IV-3 – Male Withdrawal Experience**



**Chart IV-4 – Female Withdrawal Experience**

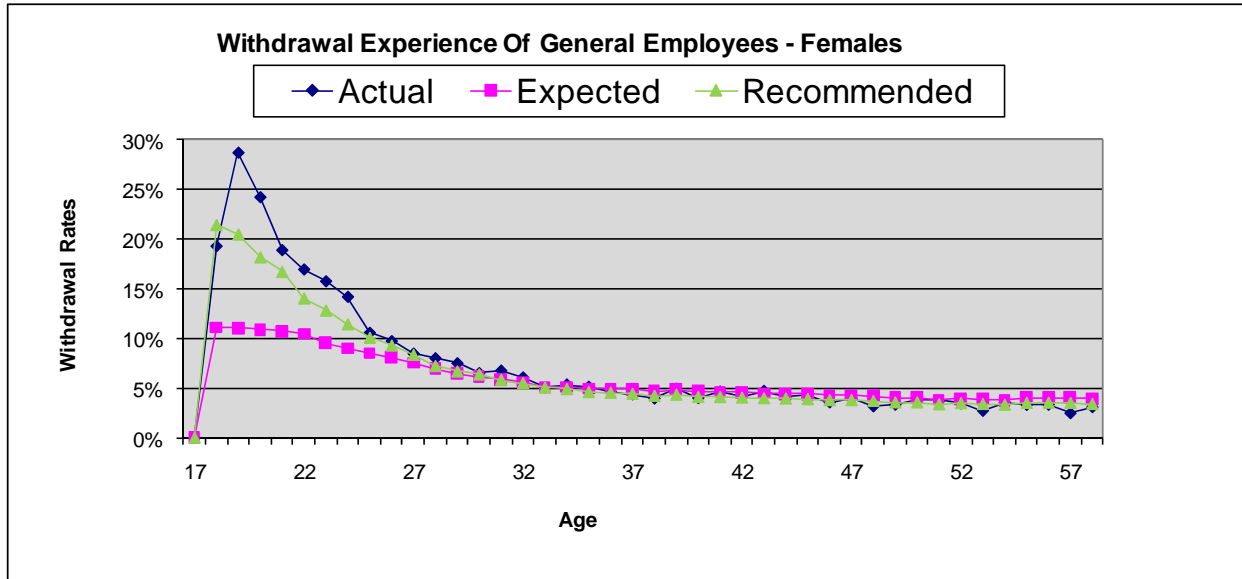


Table IV-6 summarizes the total actual terminations, expected terminations based on the current rates, the actual-to-expected ratio, and the actual-to-expected ratio based upon the recommended rates.

**TABLE IV-6  
Total Employees Leaving Active Employment**

	Actual Terminations	Expected In Valuation	Ratio Actual-to-Expected	Ratio with Recommended Rates
	2006-2010	2006-2010	2006-2010	2011-2015
Deaths	553	773	0.72	0.89
Disabilities	1,175	2,178	0.54	0.85
Superannuation Retirements	10,967	13,052	0.84	0.97
Other Separations	18,132	20,121	0.90	0.97
<b>TOTAL</b>	<b>30,827</b>	<b>36,124</b>	<b>0.85</b>	<b>0.97</b>

## **Analysis of Experience for Special Benefit Classes**

Members who are in the General Assembly, members of the Judiciary, State Police and other members of law enforcement (categorized as Hazardous Duty employees) have different patterns of termination than do Class AA and Class A members eligible to retire at age 60 or with 35 years of service. Some of the differences, such as retirement at ages before 60, are attributable to different retirement eligibility conditions; and other differences, such as terminations without eligibility for a benefit before five years, are attributable to the characteristics of the group. Table IV-7 compares the actual terminations, expected terminations based on the current rates, the actual-to-expected ratio, and the actual-to-expected ratio based upon the recommended rates for each of the employee groups.

The rates of decrement for special classes tend to fluctuate more than for general employees because there are fewer employees in special classes and, therefore, more of a statistical variation from one study to the next. We reviewed the superannuation and other separation rates and believe that it would be reasonable to set rates that project the same proportion of future retirements as the actual experience in the four and a half year study period.

We recommend that the Board adopt termination assumptions for superannuation and other terminations that approximately reproduce the actual experience of the study period.

**TABLE IV-7  
Special Benefit Classes Leaving Active Employment**

	<b>Actual Terminations</b>	<b>Expected Terminations</b>	<b>Ratio Actual-to- Expected</b>	<b>Ratio with Recommended Rates</b>
	2006-2010	2006-2010	2006-2010	2011-2015
<b>Superannuation</b>				
State Police With More Than 20 Years of Service	575	331	1.74	1.03
Other Hazardous Duty	1,938	2,364	0.82	1.00
Legislators	81	21	3.82	1.00
Members of the Judiciary	192	89	2.17	0.98
<b>Early Retirement</b>				
Hazardous Duty and State Police	515	590	0.87	1.01
Legislators	9	12	0.75	0.95
Members of the Judiciary	30	7	4.22	1.00
<b>Withdrawal</b>				
Hazardous Duty and State Police	1,346	1,625	0.83	0.99
Legislators	22	17	1.30	1.01
Members of the Judiciary	19	8	2.27	1.02

## Analysis of Annuitant Mortality

The actual and expected numbers of deaths among annuitants are shown in Table IV-8 through Table IV-11. The annuitants are categorized as non-disabled retirees, disabled retirees, and survivors. The survivor category also includes alternate payees.

The current assumptions expected 7,654 deaths for male annuitants compared to the actual deaths of 7,910 or an actual-to-expected ratio of 1.03. For females, the expected deaths were 7,483 compared to actual deaths of 7,673 or an actual-to-expected ratio also of 1.03.

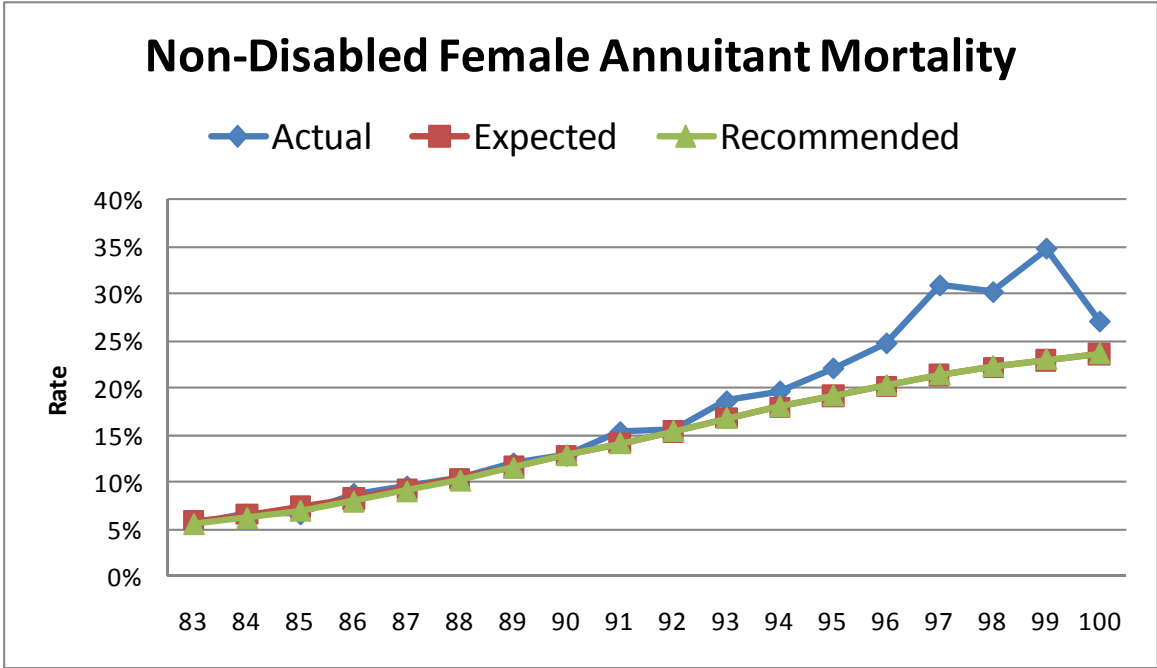
Mortality has generally improved throughout the last 100 years so we had set rates that allowed for that improvement in the future. The mortality assumption for annuitants is one of the most important factors in the valuation. As a result, we recommended mortality rates that would project an improvement in mortality.

The number of deaths among non-disabled annuitants (males and females) was 3 percent greater than expected and the number of deaths among disabled annuitants (males and females) was 1 percent greater than expected. Overall, the total number of deaths was 3 percent greater than expected. In the context of a pension plan, adverse mortality experience occurs if retirees live longer and, therefore, draw more benefits than predicted by the table (i.e., adverse experience is when a smaller number of deaths occur than expected). Since life expectancies nationally and among SERS members have continually increased, and that in turn increases the cost of the pension plan, it would be prudent to set mortality rates that have a margin reflecting that improvement. In other words, the mortality rates should be set to project fewer deaths than shown by recent experience.

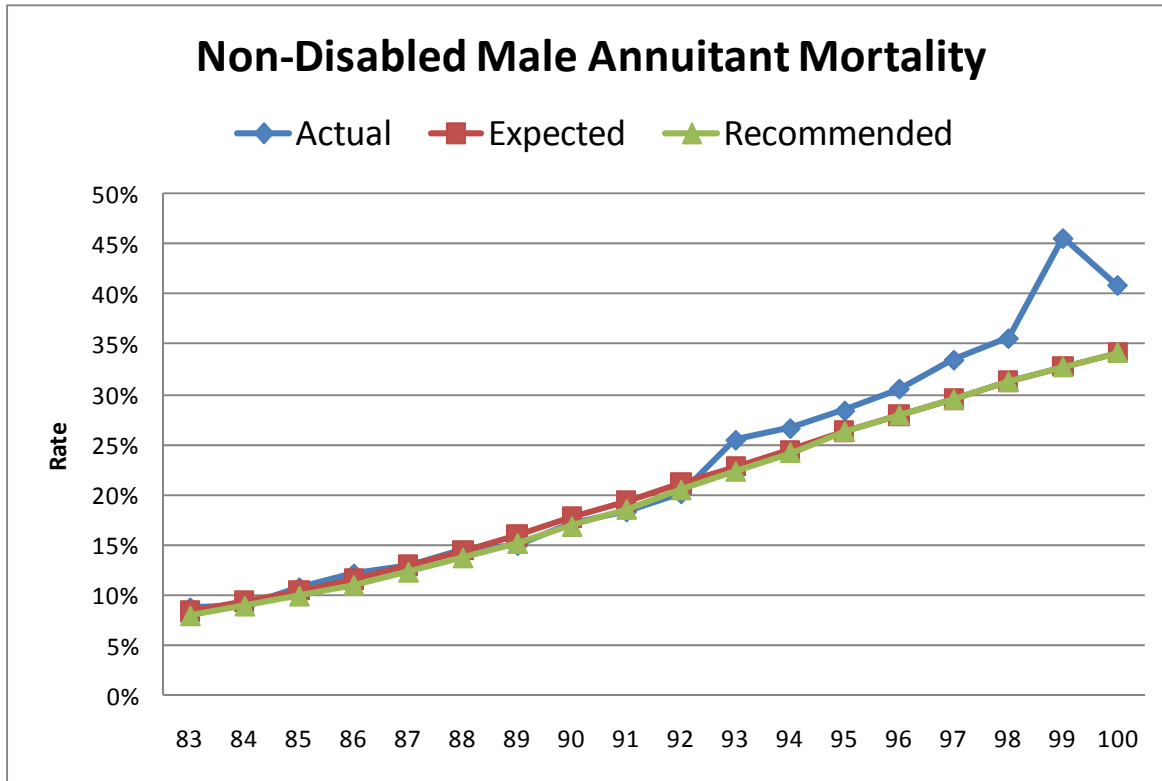
The current assumption was based on the RP-2000 tables projected to 2008, and included a margin for mortality improvement of about 10 percent. The actual deaths for non-disabled annuitants were 104 percent of expected for males and 102 percent of expected for females, indicating that some improvement in mortality has occurred. We therefore propose adjustments to the current table to provide an additional margin for mortality improvement at ages 64 through age 94 for males and ages 55 through age 89 for females. The observed mortality was much higher than expected at the advanced ages, as shown in the following charts, so no mortality improvement was applied after age 94. For younger annuitants, as shown in Table IV-8, we observed that the ratio of actual to expected deaths for males already included an adequate margin for mortality improvement at ages under age 65. For females, the observed ratio of actual to expected has an adequate margin for improvement for ages under 55. For females aged 55 and older, adjustments were made to provide an additional margin for future improvements.

Table IV-8				
Age	Ratio of Actual to		Ratio of Actual to	
	Expected Males	Recommended Males	Expected Females	Recommended Females
50-54	123%	123%	130%	130%
55-59	140%	140%	109%	116%
60-64	115%	115%	92%	106%

Graph IV-5 – Non-Disabled Female Annuitant Mortality Experience



**Graph IV-6 – Non-Disabled Male Annuitant Mortality Experience**



Mortality tables are also used to establish the early retirement and other actuarial equivalence factors used to determine benefits payable to retirees who make optional elections. The two sets of mortality assumptions, those used for the valuation and those used for the actuarial equivalence factors, should be kept in step over the long run to avoid significant additional losses or gains resulting from the exercise of optional elections at retirement. The optional elections do result in overall losses, in any event, because they are, by law, based on 4 percent interest rather than the 8 percent interest assumption used for actuarial funding.

However, we believe that it is not necessary to change the actuarial equivalence factors every time there is a change in the valuation mortality assumptions. The change in equivalence factors is a very costly and time-consuming process. SERS staff has determined that the State Employees' Retirement Code does not require that the actuarial equivalence factors be changed every time the actuarial assumptions are changed. The current set of actuarial equivalence factors were reasonable given life expectancies at the time of their adoption and they continue to reflect life expectancies fairly closely. As shown in Table IV-11 the current experience is only 103 percent of that expected during the study period. Therefore, we recommend that the actuarial equivalence factors remain unchanged but that the issue be reconsidered at the time of the next experience study.



**TABLE IV-9  
Deaths of Male Annuitants**

	<b>Actual Deaths</b>	<b>Expected Deaths</b>	<b>Ratio Actual-to- Expected</b>	<b>Expected with Recommended Rates</b>	<b>Ratio Actual-to- Expected</b>
	2006-2010	2006-2010	2006-2010	2006-2010	2011-2015
Non-disabled Retirees and Survivors	7,262	6,957	1.04	6,671	1.09
Disabled Retirees	648	697	0.93	662	0.98
<b>TOTAL</b>	7,910	7,654	1.03	7,333	1.08

**TABLE IV-10  
Deaths of Female Annuitants**

	<b>Actual Deaths</b>	<b>Expected Deaths</b>	<b>Ratio Actual-to- Expected</b>	<b>Expected with Recommended Rates</b>	<b>Ratio Actual-to- Expected</b>
	2006-2010	2006-2010	2006-2010	2006-2010	2011-2015
Non-disabled Retirees and Survivors	7,152	7,022	1.02	6,705	1.07
Disabled Retirees	521	461	1.13	496	1.05
<b>TOTAL</b>	7,673	7,483	1.03	7,201	1.06

**TABLE IV-11  
Total Deaths of Annuitants**

	<b>Actual Deaths</b>	<b>Expected Deaths</b>	<b>Ratio Actual-to- Expected</b>	<b>Expected with Recommended Rates</b>	<b>Ratio Actual-to- Expected</b>
	2006-2010	2006-2010	2006-2010	2006-2010	2011-2015
Non-disabled Retirees and Survivors	14,414	13,979	1.03	13,376	1.08
Disabled Retirees	1,169	1,158	1.01	1,158	1.00
<b>TOTAL</b>	<b>15,583</b>	<b>15,137</b>	<b>1.03</b>	<b>14,534</b>	<b>1.07</b>

## V. Other Experience Analyses

### Optional Retirement Elections

The valuation includes a prediction of the number of new retirees who will select each of the options. Prediction of the proportion that will elect Option 4 is particularly important because of the adverse effect on the fund of each such election. Table V-1 compares the current assumptions to the selection by new retirees during the experience period. Option 4, the return of the present value of all or part of the employee contributions, can be selected along with any other available option. The experience study shows an increase in the selection of an Option 1 form of benefit and a decline in the prevalence of Option 2, 3 or other forms of benefit with Option 1.

**TABLE V-1**  
**Assumed Elections of Options at Retirement**

<b>Election</b>	<b>Current Assumption</b>	<b>Experience</b>	<b>Recommended Assumption</b>
I. Single Life Annuity	32%	32.6%	33%
II. Option 1	28%	38.5%	41%
III. Option 2 or 3 or other percentage survivor	27%	24.4%	26%
IV. Option 1 combined with 2, 3 or other	13%	4.5%	Included in II and III.
V. Total	100%	100%	100%
VI. Election Including Option 4	84%	84.7%	85%

The recommended assumptions are shown in the table and as IV is combined with II for valuation purposes, these assumptions are very similar to the current assumptions. Eleven percent of the Option 4 withdrawals were partial, but we recommend assuming the maximum permitted withdrawals for Option 4 elections. That will be slightly conservative since partial withdrawals are less costly.

## **Purchases of Service**

Employees can purchase certain past service by agreeing to pay the cost of that service. The most common purchases are for past SERS service and for military service. Before Act 9 in 2001 employees had to agree to pay the cost in a lump sum or in installment payments over no more than three years. Board policy permits payments over as long as six years. Act 9 permitted members to defer payment until retirement. The deferred payments, plus interest, are used to reduce the benefits at retirement.

We recommend the continued use of the current assumptions.

## VI. Conclusion

Our recommended changes, in total, would continue the Board policy of establishing moderately conservative assumptions. The assumptions, as a set, are conservative in that they produce a somewhat higher employer cost than would be produced without including the conservatism. Use of the recommended set of assumptions would allow some margin for adverse experience without significantly overstating the current cost of the system.

Most of the demographic assumptions were set to be close to or the same as experience in the last five years. We propose two deviations from that approach that, we believe, are justified by the analysis of those particular rates. First, as in the past, we are recommending adding a margin to the annuitant mortality rates to anticipate continued improvement in mortality. The SERS experience shows some signs that the continuous improvement in mortality may have paused, with higher than expected mortality at both younger (under 55) and older (over 90) ages. Second, we assume that the rate of disability retirements will be lower, but not as large a decrease in rates as observed during the last five years. Thus we have set the disability rates to 85 percent of the experience rather than 100 percent.

Some of the changes in assumptions will increase the projected cost of the retirement system and some will decrease the cost. Overall, we expect that adoption of the recommended assumptions will slightly lower costs, due primarily to the slower expected pace of future salary increases.

## VII. Considerations for Members Accruing Benefits Under Act 120

On November 23, 2010, Governor Rendell signed HB 2497 in to law as Act 120. This legislation preserves all the benefits now in place for all current members but mandates a number of benefit reductions for future members effective January 1, 2011 (except that the effective date is the expiration of collective bargaining agreements for State Police Troopers, Capitol Police and Park Rangers, and December 1, 2010 for legislators newly elected in November. State Police would retain the special retirement benefits they currently receive as a result of a collective bargaining arbitration award known as the DiLauro Award).

The following benefit provisions are included the bill:

**Creates a new A-3 Class of Service for future non-judicial employees entering SERS membership on or after Jan. 1, 2011.** As is the case with most current SERS members, the new A-3 members will contribute 6.25% of their pay toward their benefit; however, they will accrue benefits at only 2% of their Final Average Salary for each year of Credited Service (as opposed to the 2.5% accrual rate for most current members).

**Creates an optional new A-4 Class of Service for future non-judicial employees entering SERS membership on or after Jan. 1, 2011.** New members who elect this Class of Service will contribute 9.3% of their pay toward their benefit in order to accrue benefits at the rate most members currently do, 2.5% of their Final Average Salary for each year of Credited Service. This higher benefit will be entirely funded through the higher employee contribution rate. There will be no additional cost to the employers.

**Increases the Vesting period for A-3 and A-4 members to 10 years,** as opposed to five years under current law.

**Eliminates “Option 4” lump sum withdrawals of Accumulated Deductions for A-3 and A-4 members otherwise eligible to receive monthly benefits.**

**Increases the Normal Retirement Age for Class A-3 and A-4 members.** Normal retirement age for most members in the new classes will increase from age 60 to age 65 with a minimum of three years of Credited Service. For those members in the new classes in positions that currently have an age 50 Normal Retirement Age, an increase to age 55 with a minimum of three years of Credited Service including law enforcement officers and legislators. The special retirement terms provided to State Police Troopers under their arbitration award will continue in effect.

**Replaces the current 35-years-of-service superannuation provision with a Rule of 92 with 35 Minimum Years of Service provision.** The “Rule of 92” portion of this new dual superannuation eligibility rule will be met when a member’s age (last birthday) plus his/her completed years of credited service total at least 92. The effect of this provision is to require that State employees entering the workforce at a very young age would have to work a few additional years before superannuating. (Upon meeting the superannuation thresholds, a member becomes eligible to retire before reaching normal retirement age without incurring an early retirement reduction.)

**Requires members who wish to purchase creditable nonstate service, other than intervening military or magisterial service, to pay the full actuarial cost of the increased benefit attributable to the purchase.**

**Implements a “shared risk” provision that introduces the possibility of higher or lower member contribution rates for future members.** Higher or lower member contribution rates could be triggered when annual investment returns over a multi-year period are higher or lower than the rate assumed for SERS’ valuations. Member contributions could never be lower than the base rates set in the bill of 6.25% for A-3 Class of Service or 9.3% for A-4 Class of Service.

Table A-19 sets out the recommended early retirement rates for Class A-3 and Class A-4 employees.

Table A-20 sets out the recommended superannuation retirement rates for Class A-3 and Class A-4 employees.

For all other rates (mortality, disability, withdrawal), we recommend using the same rates as for General employees.

## VIII. Actuarial Certification

This report presents an investigation of the actuarial experience of the State Employees' Retirement System of the Commonwealth of Pennsylvania, covering the period from January 1, 2006 to December 31, 2010

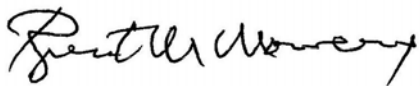
The recommended rates shown in this report are reasonable actuarial assumptions. However, a different set of rates could also be considered reasonable actuarial assumptions. The reason for this is that actuarial standards of practice describe a "best-estimate range" for each assumption, rather than a single best-estimate value. Thus, reasonable rates differing from those presented in this report could have been developed by selecting different points within the best-estimate ranges for various assumptions.

The actuaries certifying to this investigation are members of the American Academy of Actuaries and other professional actuarial organizations, and meet the General Qualification Standards of the American Academy of Actuaries for purposes of issuing Statements of Actuarial Opinion.

Respectfully submitted,  
Hay Group  
January 12, 2011



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## **IX. Glossary**

**Actual-to-Expected Ratio** – The actual number of members leaving for a specific cause (such as retirement) divided by the number the actuary expected to leave.

**Actuarial Assumptions** – Predicted probability of future events including economic and demographic assumptions.

**ASOP** – Actuarial Standard of Practice; ASOPs are promulgated by the Actuarial Standards Board.

**Demographic Assumptions** – Predictions about the rate at which employees will leave the retirement plan and the rate at which annuitants will die. These include rates of retirement and disability.

**Economic Assumptions** – Predictions about the future earnings of the retirement fund, salary growth and inflation.

**Investment Rate** – The expected return on plan assets. This rate is expressed as an annual rate and is a compound rate, meaning that a sum of \$10,000 invested for 10 years at 8 percent will yield \$21,589.

**Salary Growth Rate** – The expected increase in salary from the current year to the next year. Salary increase rates vary with service, with larger percentage increases expected in the beginning of an employee's career and smaller increases expected in the later years.

## Appendix – Recommended Assumptions

The recommended assumptions are shown in detail in the following tables.

Recommended Economic Assumptions					
	Annual Inflation	Investment Return		Salary Growth	
		Nominal	Real	Nominal	Real
<b>Recommended</b>	2.75%	8.00%	5.1%	3.05%	0.3%
<b>Current</b> 2008 & 2009	3.00%	8.00%	4.9%	3.30%	0.3%
<b>Prior</b> 1995 – 2007	3.00%	8.50%	5.3%	3.30%	0.3%

Table A – 1	Career Salary Increase Rates
Table A – 2	Mortality Rates for All Active Employees
Table A – 3	Disability Retirement Rates for All Active Employees
Table A – 4	Superannuation Retirement Rates for General Employees
Table A – 5	Early Retirement Rates for General Employees with 15 or More Years of Service
Table A – 6	Early Retirement Rates for General Employees with 4 – 14 Years of Service
Table A – 7	Recommended Withdrawal Rates for General Employees (Current Rates Not Shown)
Table A – 8	Mortality Rates for Non-Disabled Annuitants and Survivors
Table A – 9	Mortality Rates for Disabled Annuitants
Table A – 10	Superannuation Retirement Rates for State Police
Table A – 11	Superannuation Retirement Rates for Hazardous Duty Employees
Table A – 12	Early Retirement Rates for State Police and Hazardous Duty Employees
Table A – 13	Withdrawal Rates for State Police and Hazardous Duty Employees
Table A – 14	Superannuation Retirement Rates for Legislators
Table A – 15	Early Retirement Rates for Legislators
Table A – 16	Withdrawal Rates for Legislators
Table A – 17	Superannuation Rates for Judicial Officers
Table A – 18	Early Retirement Rates for Judicial Officers
Table A – 19	Withdrawal Rates for Judicial Officers
Table A – 20	Early Retirement Rates for Class A-3 and A-4 General Employees
Table A – 21	Superannuation Retirement Rates for Class A-3 and A-4 General Employees

## Career Salary Increase Rates

Table A-1 shows the actual salary growth experience (A), current total salary increase assumptions from general and career increases combined (B), recommended total salary increase assumptions (C), the current career salary increase assumptions (D) and the recommended career salary increase assumptions (E).

Table A-1 Development of Recommended Career Salary Increase Assumptions					
Years of Credited Service	Actual Salary Increase	Current Assumed Total Salary Increase	Recommended Total Salary Increase	Current Career Salary Increase	Recommended Career Salary Increase
	(A)	(B)	(C)	(D)	(E)
1	9.08%	20.20%	11.05%	16.90%	8.00%
2	7.24%	11.60%	9.05%	8.30%	6.00%
3	6.40%	9.20%	7.55%	5.90%	4.50%
4	6.63%	7.90%	7.05%	4.60%	4.00%
5	6.47%	7.50%	6.80%	4.20%	3.75%
6	6.43%	7.10%	6.55%	3.80%	3.50%
7	6.21%	6.80%	6.30%	3.50%	3.25%
8	5.69%	6.50%	6.25%	3.20%	3.20%
9	5.78%	6.50%	6.20%	3.20%	3.15%
10	5.50%	6.40%	6.15%	3.10%	3.10%
11	5.44%	6.30%	6.05%	3.00%	3.00%
12	5.19%	6.20%	5.95%	2.90%	2.90%
13	5.02%	6.10%	5.85%	2.80%	2.80%
14	5.34%	6.10%	5.75%	2.80%	2.70%
15	4.33%	6.00%	5.65%	2.70%	2.60%
16	5.20%	5.90%	5.55%	2.60%	2.50%
17	4.96%	5.80%	5.45%	2.50%	2.40%
18	4.76%	5.70%	5.35%	2.40%	2.30%
19	4.58%	5.60%	5.25%	2.30%	2.20%
20	4.75%	5.50%	5.15%	2.20%	2.10%
21	4.60%	5.40%	5.05%	2.10%	2.00%
22	4.68%	5.30%	4.95%	2.00%	1.90%
23	4.40%	5.20%	4.85%	1.90%	1.80%
24	4.50%	5.10%	4.75%	1.80%	1.70%
25	4.53%	5.00%	4.65%	1.70%	1.60%

**Table A-1  
Development of Recommended Career Salary Increase Assumptions**

<b>Years of Credited Service</b>	<b>Actual Salary Increase</b>	<b>Current Assumed Total Salary Increase</b>	<b>Recommended Total Salary Increase</b>	<b>Current Career Salary Increase</b>	<b>Recommended Career Salary Increase</b>
	<b>(A)</b>	<b>(B)</b>	<b>(C)</b>	<b>(D)</b>	<b>(E)</b>
26	4.33%	4.90%	4.55%	1.60%	1.50%
27	4.06%	4.90%	4.45%	1.60%	1.40%
28	4.28%	4.90%	4.35%	1.60%	1.30%
29	4.16%	4.90%	4.30%	1.60%	1.25%
30	4.17%	4.90%	4.30%	1.60%	1.25%
31	4.07%	4.90%	4.30%	1.60%	1.25%
32	4.12%	4.90%	4.30%	1.60%	1.25%
33	4.13%	4.90%	4.30%	1.60%	1.25%
34	4.21%	4.90%	4.30%	1.60%	1.25%
35	4.29%	4.90%	4.30%	1.60%	1.25%
36	4.01%	4.90%	4.30%	1.60%	1.25%
37	4.04%	4.90%	4.30%	1.60%	1.25%
38	4.09%	4.90%	4.30%	1.60%	1.25%
39	4.16%	4.90%	4.30%	1.60%	1.25%
40	3.90%	4.90%	4.30%	1.60%	1.25%

<b>Table A-2</b>				
<b>Mortality Rates for All Active Employees</b>				
<b>Age</b>	<b>Males Current</b>	<b>Males Recommended</b>	<b>Females Current</b>	<b>Females Recommended</b>
17	0.0002	0.0004	0.0001	0.0001
18	0.0002	0.0004	0.0001	0.0001
19	0.0002	0.0004	0.0002	0.0002
20	0.0002	0.0004	0.0002	0.0002
21	0.0002	0.0004	0.0002	0.0002
22	0.0002	0.0004	0.0002	0.0002
23	0.0002	0.0004	0.0002	0.0002
24	0.0002	0.0004	0.0002	0.0002
25	0.0002	0.0004	0.0002	0.0002
26	0.0002	0.0004	0.0002	0.0002
27	0.0002	0.0004	0.0002	0.0002
28	0.0003	0.0004	0.0002	0.0002
29	0.0003	0.0004	0.0002	0.0002
30	0.0003	0.0005	0.0002	0.0002
31	0.0003	0.0005	0.0002	0.0002
32	0.0004	0.0005	0.0002	0.0002
33	0.0004	0.0005	0.0003	0.0003
34	0.0004	0.0005	0.0003	0.0003
35	0.0005	0.0006	0.0003	0.0003
36	0.0005	0.0006	0.0003	0.0003
37	0.0005	0.0007	0.0004	0.0004
38	0.0005	0.0007	0.0004	0.0004
39	0.0006	0.0008	0.0004	0.0004
40	0.0006	0.0008	0.0005	0.0004
41	0.0007	0.0009	0.0005	0.0004
42	0.0008	0.0009	0.0006	0.0005
43	0.0009	0.0010	0.0006	0.0005
44	0.0010	0.0010	0.0007	0.0006
45	0.0012	0.0012	0.0007	0.0006
46	0.0013	0.0014	0.0007	0.0007
47	0.0015	0.0016	0.0009	0.0007
48	0.0016	0.0018	0.0010	0.0008
49	0.0019	0.0020	0.0011	0.0008
50	0.0021	0.0022	0.0012	0.0009
51	0.0023	0.0023	0.0012	0.0009
52	0.0025	0.0024	0.0014	0.0010
53	0.0027	0.0025	0.0015	0.0010
54	0.0030	0.0026	0.0016	0.0012
55	0.0033	0.0027	0.0018	0.0014

<b>Table A-2</b>				
<b>Mortality Rates for All Active Employees</b>				
<b>Age</b>	<b>Males Current</b>	<b>Males Recommended</b>	<b>Females Current</b>	<b>Females Recommended</b>
56	0.0035	0.0028	0.0020	0.0016
57	0.0038	0.0029	0.0021	0.0018
58	0.0041	0.0030	0.0024	0.0020
59	0.0044	0.0031	0.0026	0.0022
60	0.0048	0.0032	0.0030	0.0024
61	0.0053	0.0034	0.0033	0.0026
62	0.0059	0.0036	0.0036	0.0028
63	0.0065	0.0038	0.0040	0.0030
64	0.0073	0.0040	0.0045	0.0035
65	0.0083	0.0045	0.0049	0.0040
66	0.0093	0.0050	0.0054	0.0045
67	0.0105	0.0055	0.0061	0.0050
68	0.0118	0.0062	0.0068	0.0060
69	0.0132	0.0070	0.0077	0.0070
70	0.0146	0.0080	0.0087	0.0080
71	0.0160	0.0090	0.0099	0.0090
72	0.0177	0.0100	0.0113	0.0100
73	0.0194	0.0120	0.0129	0.0110
74	0.0214	0.0145	0.0148	0.0120
75	0.0236	0.0170	0.0168	0.0130
76	0.0262	0.0200	0.0190	0.0140
77	0.0290	0.0240	0.0215	0.0150
78	0.0322	0.0260	0.0242	0.0160
79	0.0355	0.0280	0.0270	0.0170
80	0.0355	0.0300	0.0270	0.0180
81	0.0355	0.0300	0.0270	0.0190
82+	0.0355	0.0300	0.0270	0.0200

<b>Table A-3</b>				
<b>Disability Retirement Rates for All Active Employees</b>				
<b>Age</b>	<b>Males</b>		<b>Females</b>	
	<b>Current</b>	<b>Recommended</b>	<b>Current</b>	<b>Recommended</b>
23	0.00030	0.00023	0.00070	0.00039
24	0.00030	0.00023	0.00070	0.00039
25	0.00030	0.00023	0.00070	0.00039
26	0.00050	0.00038	0.00080	0.00044
27	0.00050	0.00038	0.00100	0.00055
28	0.00100	0.00050	0.00100	0.00055
29	0.00090	0.00068	0.00140	0.00077
30	0.00090	0.00068	0.00170	0.00094
31	0.00100	0.00075	0.00200	0.00110
32	0.00110	0.00083	0.00220	0.00121
33	0.00120	0.00090	0.00260	0.00143
34	0.00150	0.00113	0.00280	0.00154
35	0.00160	0.00120	0.00290	0.00160
36	0.00170	0.00128	0.00300	0.00165
37	0.00170	0.00128	0.00310	0.00171
38	0.00180	0.00135	0.00340	0.00187
39	0.00190	0.00143	0.00360	0.00198
40	0.00250	0.00188	0.00380	0.00209
41	0.00280	0.00210	0.00420	0.00231
42	0.00320	0.00240	0.00460	0.00253
43	0.00350	0.00263	0.00510	0.00281
44	0.00390	0.00293	0.00530	0.00292
45	0.00440	0.00330	0.00600	0.00330
46	0.00470	0.00353	0.00670	0.00369
47	0.00510	0.00383	0.00720	0.00396
48	0.00520	0.00390	0.00800	0.00440
49	0.00580	0.00435	0.00860	0.00473
50	0.00610	0.00458	0.00910	0.00501
51	0.00650	0.00488	0.00950	0.00523
52	0.00680	0.00510	0.01000	0.00550
53	0.00740	0.00555	0.01060	0.00583
54	0.00770	0.00578	0.01100	0.00605
55	0.00800	0.00600	0.01150	0.00633

<b>Table A-3 Disability Retirement Rates for All Active Employees</b>				
56	0.00820	0.00615	0.01200	0.00660
57	0.00860	0.00645	0.01250	0.00688
58	0.00880	0.00660	0.01300	0.00715
59	0.00920	0.00690	0.01350	0.00743
60	0.00000	0.00000	0.00000	0.00000



**Table A-4  
Comparison of Current and Recommended  
Superannuation Retirement Rates for General Employees**

<b>Age</b>	<b>Current Superannuation Retirement Rates Males and Females</b>	<b>Recommended Superannuation Retirement Rates Male</b>	<b>Recommended Superannuation Retirement Rates Female</b>
53	30%	25%	23%
54	30%	26%	23%
55	30%	27%	23%
56	30%	28%	23%
57	30%	30%	23%
58	30%	30%	23%
59	30%	30%	23%
60	25%	25%	25%
61	25%	20%	20%
62	33%	25%	25%
63	22%	20%	20%
64	22%	20%	20%
65	33%	25%	25%
66 to 79	22%	20%	20%
80	100%	100%	100%

**Table A-5**  
**Early Retirement Rates for Active General Employees with 15 or more Years of Service**

<b>Age</b>	<b>Males Current</b>	<b>Males Recommended</b>	<b>Females Current</b>	<b>Females Recommended</b>
31	0.03860	0.01500	0.05060	0.01500
32	0.03860	0.01500	0.05060	0.01500
33	0.02630	0.01500	0.02710	0.01500
34	0.02630	0.01500	0.02710	0.01500
35	0.02630	0.01500	0.02710	0.01500
36	0.02630	0.01500	0.02710	0.01500
37	0.02630	0.01500	0.02710	0.01500
38	0.02630	0.01500	0.02710	0.01500
39	0.02630	0.01500	0.02710	0.01500
40	0.02630	0.01500	0.02710	0.01500
41	0.02630	0.01500	0.02710	0.01500
42	0.02630	0.01500	0.02710	0.01500
43	0.02630	0.01500	0.02710	0.01500
44	0.02630	0.01500	0.02710	0.01500
45	0.02630	0.01500	0.02710	0.01500
46	0.02630	0.01500	0.02710	0.01500
47	0.02630	0.02000	0.02710	0.02000
48	0.02630	0.02000	0.02710	0.02000
49	0.02630	0.02000	0.02710	0.02000
50	0.02630	0.02000	0.02710	0.02000
51	0.02630	0.03000	0.02710	0.03000
52	0.02630	0.04000	0.02710	0.04000
53	0.02630	0.04500	0.02710	0.04500
54	0.02630	0.05000	0.02710	0.05000
55	0.03860	0.05500	0.03890	0.05500
56	0.03860	0.06000	0.03890	0.06000
57	0.03860	0.08000	0.03890	0.08000
58	0.03860	0.10000	0.03890	0.10000
59	0.13730	0.15000	0.15660	0.15000
60	0.00000	0.00000	0.00000	0.00000

**Table A-6**  
**Early Retirement Rates for Active General Employees with 4 -14 Years**  
**of Service**

<b>Age</b>	<b>Males Current</b>	<b>Males Recommended</b>	<b>Females Current</b>	<b>Females Recommended</b>
21	0.02960	0.01000	0.04050	0.01000
22	0.02960	0.01000	0.04050	0.01000
23	0.02960	0.01000	0.03980	0.01000
24	0.02960	0.01000	0.03990	0.01000
25	0.02960	0.01000	0.03880	0.01000
26	0.02960	0.01000	0.03710	0.01000
27	0.02960	0.01000	0.03540	0.01000
28	0.02550	0.01000	0.03450	0.01000
29	0.02510	0.01500	0.03520	0.01500
30	0.02490	0.01500	0.03530	0.01500
31	0.02460	0.01500	0.03520	0.01500
32	0.02460	0.01500	0.03500	0.01500
33	0.01950	0.01500	0.02810	0.01500
34	0.01910	0.01500	0.02820	0.01500
35	0.01890	0.01500	0.02840	0.01500
36	0.01890	0.01500	0.02830	0.01500
37	0.01880	0.01500	0.02810	0.01500
38	0.01870	0.01500	0.02290	0.01500
39	0.01880	0.01000	0.02270	0.01000
40	0.01690	0.01000	0.01720	0.01000
41	0.01690	0.01000	0.01660	0.01000
42	0.01680	0.01000	0.01640	0.01000
43	0.01690	0.01000	0.01680	0.01000
44	0.01690	0.01000	0.01640	0.01000
45	0.01120	0.01000	0.01640	0.01000
46	0.01110	0.01000	0.01470	0.01000
47	0.01100	0.01000	0.01480	0.01000
48	0.01080	0.01000	0.01310	0.01000
49	0.01090	0.01000	0.01300	0.01000
50	0.00950	0.01000	0.01300	0.01000
51	0.00960	0.01000	0.01250	0.01000
52	0.00950	0.01000	0.01240	0.01000
53	0.00950	0.01000	0.01210	0.01000

**Table A-6  
Early Retirement Rates for Active General Employees with 4 -14 Years  
of Service**

<b>Age</b>	<b>Males Current</b>	<b>Males Recommended</b>	<b>Females Current</b>	<b>Females Recommended</b>
54	0.00970	0.01000	0.01200	0.01000
55	0.02330	0.01000	0.02330	0.01000
56	0.02330	0.01000	0.02330	0.01000
57	0.02330	0.01000	0.02330	0.01000
58	0.02330	0.01000	0.02330	0.01000
59	0.08250	0.03000	0.09370	0.03000
60	0.00000	0.00000	0.00000	0.00000

**Table A-7 Recommended Withdrawal Rates for Males**

Service	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Age															
17	0.20738	0.17775													
18	0.20738	0.17775	0.12500												
19	0.20738	0.17775	0.12500	0.06777											
20	0.20738	0.17775	0.12500	0.06777	0.05273										
21	0.20738	0.17775	0.11500	0.06777	0.05273	0.00888									
22	0.20738	0.17775	0.11500	0.06777	0.05273	0.00888	0.00788								
23	0.20300	0.17400	0.11213	0.06219	0.04815	0.00788	0.00788	0.00788							
24	0.17400	0.17400	0.11213	0.06219	0.04815	0.00788	0.00788	0.00788	0.00788						
25	0.16240	0.14500	0.11213	0.06219	0.04815	0.00788	0.00788	0.00788	0.00788	0.00788					
26	0.15080	0.13920	0.11213	0.06219	0.04815	0.00788	0.00788	0.00788	0.00788	0.00788	0.00988				
27	0.14500	0.13920	0.11213	0.06219	0.04815	0.00788	0.00788	0.00788	0.00788	0.00788	0.00988	0.00880			
28	0.14500	0.13920	0.11213	0.06219	0.04815	0.00788	0.00632	0.00592	0.00592	0.00592	0.00772	0.00680	0.00672		
29	0.14500	0.13920	0.11213	0.06219	0.04815	0.00788	0.00632	0.00592	0.00592	0.00592	0.00772	0.00680	0.00672	0.00672	
30	0.13888	0.13332	0.09713	0.06219	0.04815	0.00788	0.00632	0.00592	0.00592	0.00592	0.00772	0.00680	0.00672	0.00672	0.00616
31	0.13888	0.13332	0.09713	0.06219	0.04815	0.00788	0.00632	0.00592	0.00592	0.00592	0.00772	0.00680	0.00672	0.00672	0.00616
32	0.13888	0.13332	0.09713	0.06219	0.04815	0.00788	0.00632	0.00592	0.00592	0.00592	0.00772	0.00680	0.00672	0.00672	0.00616
33	0.13888	0.13332	0.09713	0.05886	0.04538	0.00732	0.00572	0.00472	0.00472	0.00396	0.00572	0.00484	0.00472	0.00472	0.00420
34	0.13888	0.13332	0.09713	0.05886	0.04538	0.00732	0.00572	0.00472	0.00472	0.00396	0.00572	0.00484	0.00472	0.00472	0.00420
35	0.13575	0.13032	0.09461	0.05886	0.04538	0.00732	0.00572	0.00472	0.00472	0.00396	0.00572	0.00484	0.00472	0.00472	0.00420
36	0.13466	0.12489	0.09370	0.05886	0.04538	0.00732	0.00572	0.00472	0.00472	0.00396	0.00572	0.00484	0.00472	0.00472	0.00420
37	0.13358	0.12380	0.09280	0.05886	0.04538	0.00732	0.00572	0.00472	0.00472	0.00396	0.00572	0.00484	0.00472	0.00472	0.00420
38	0.13249	0.12272	0.09190	0.05886	0.04538	0.00732	0.00572	0.00472	0.00472	0.00396	0.00572	0.00484	0.00472	0.00472	0.00420
39	0.13141	0.12163	0.09100	0.05886	0.04538	0.00732	0.00572	0.00472	0.00472	0.00396	0.00572	0.00484	0.00472	0.00472	0.00420
40	0.13032	0.12055	0.09010	0.05559	0.03518	0.00512	0.00396	0.00396	0.00396	0.00396	0.00532	0.00484	0.00472	0.00472	0.00420
41	0.12923	0.11946	0.09010	0.05559	0.03518	0.00512	0.00396	0.00396	0.00396	0.00396	0.00532	0.00484	0.00472	0.00472	0.00420

**Table A-7 Recommended Withdrawal Rates for Males**

Service	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Age															
42	0.12815	0.11837	0.09010	0.05559	0.03518	0.00512	0.00396	0.00396	0.00396	0.00396	0.00532	0.00484	0.00472	0.00472	0.00420
43	0.12706	0.11729	0.09010	0.05143	0.03518	0.00512	0.00396	0.00396	0.00396	0.00396	0.00532	0.00484	0.00472	0.00472	0.00420
44	0.12598	0.11620	0.09010	0.05143	0.03518	0.00512	0.00396	0.00396	0.00396	0.00396	0.00532	0.00484	0.00472	0.00472	0.00420
45	0.12064	0.11119	0.08640	0.05143	0.03518	0.00512	0.00356	0.00256	0.00256	0.00196	0.00336	0.00288	0.00276	0.00276	0.00224
46	0.11959	0.11015	0.08640	0.05143	0.03518	0.00512	0.00356	0.00256	0.00256	0.00196	0.00336	0.00288	0.00276	0.00276	0.00224
47	0.11854	0.10910	0.08640	0.05143	0.03518	0.00512	0.00356	0.00256	0.00256	0.00196	0.00316	0.00288	0.00276	0.00276	0.00224
48	0.11749	0.10805	0.08640	0.05143	0.03518	0.00512	0.00356	0.00256	0.00256	0.00196	0.00316	0.00288	0.00276	0.00276	0.00224
49	0.11644	0.10700	0.08640	0.05143	0.03518	0.00512	0.00356	0.00256	0.00256	0.00196	0.00316	0.00288	0.00276	0.00276	0.00224
50	0.11264	0.10445	0.07400	0.05143	0.03240	0.00456	0.00296	0.00196	0.00196	0.00196	0.00256	0.00256	0.00256	0.00256	0.00224
51	0.11264	0.10445	0.07400	0.05143	0.03240	0.00456	0.00296	0.00196	0.00196	0.00196	0.00256	0.00256	0.00256	0.00256	0.00224
52	0.11264	0.10445	0.07400	0.05143	0.03240	0.00456	0.00296	0.00196	0.00196	0.00196	0.00256	0.00256	0.00256	0.00256	0.00224
53	0.11264	0.10445	0.07400	0.05143	0.03240	0.00456	0.00296	0.00196	0.00196	0.00196	0.00256	0.00256	0.00256	0.00256	0.00224
54	0.11264	0.10445	0.07400	0.05143	0.03240	0.00456	0.00296	0.00196	0.00196	0.00196	0.00256	0.00256	0.00256	0.00256	0.00224
55	0.11264	0.10445	0.07400	0.05143	0.03240	0.00592	0.00592	0.00592	0.00592	0.00592	0.00652	0.00652	0.00652	0.00652	0.00616
56	0.11264	0.10445	0.07400	0.05143	0.03240	0.00592	0.00592	0.00592	0.00592	0.00592	0.00652	0.00652	0.00652	0.00652	0.00616
57	0.11264	0.10445	0.07400	0.05143	0.03240	0.00592	0.00592	0.00592	0.00592	0.00592	0.00652	0.00652	0.00652	0.00652	0.00616
58	0.11264	0.10445	0.07400	0.05143	0.03240	0.00592	0.00592	0.00592	0.00592	0.00592	0.00652	0.00652	0.00652	0.00652	0.00616
59	0.11264	0.10445	0.07400	0.05143	0.03240	0.00592	0.00592	0.00592	0.00592	0.00592	0.00652	0.00652	0.00652	0.00652	0.00616

**Table A-7 Recommended Withdrawal Rates for Females**

Service	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Age															
17	0.22380	0.16065	-	-	-	-	-	-	-	-	-	-	-	-	-
18	0.22380	0.16065	0.10480	-	-	-	-	-	-	-	-	-	-	-	-
19	0.22380	0.16065	0.10480	0.09180	-	-	-	-	-	-	-	-	-	-	-
20	0.22380	0.16065	0.10480	0.09180	0.08240	-	-	-	-	-	-	-	-	-	-
21	0.22380	0.16065	0.10480	0.09180	0.08240	0.02920	-	-	-	-	-	-	-	-	-
22	0.22380	0.10710	0.10480	0.09180	0.08240	0.02920	0.02331	-	-	-	-	-	-	-	-
23	0.20480	0.10240	0.09540	0.09180	0.08240	0.02680	0.02331	0.02115	-	-	-	-	-	-	-
24	0.20480	0.10240	0.09300	0.09180	0.08240	0.02680	0.02331	0.02115	0.01908	-	-	-	-	-	-
25	0.20480	0.10240	0.09300	0.09180	0.08240	0.02680	0.02331	0.02115	0.01908	0.01908	-	-	-	-	-
26	0.17920	0.10240	0.09300	0.09180	0.08240	0.02680	0.02331	0.02115	0.01908	0.01908	0.02547	-	-	-	-
27	0.17920	0.10240	0.09300	0.09180	0.08240	0.02680	0.02331	0.01908	0.01908	0.01908	0.02331	0.02331	-	-	-
28	0.17920	0.09216	0.08370	0.08262	0.07416	0.02412	0.02115	0.01908	0.01908	0.01692	0.02331	0.02331	0.02331	-	-
29	0.17920	0.09216	0.08370	0.08262	0.07416	0.02412	0.02115	0.01908	0.01908	0.01692	0.02331	0.02331	0.02331	0.02331	-
30	0.17920	0.09216	0.08370	0.08262	0.07416	0.02412	0.02115	0.01908	0.01908	0.01692	0.02331	0.02331	0.02331	0.02331	0.01827
31	0.15360	0.09216	0.08370	0.08262	0.07416	0.02412	0.02115	0.01908	0.01908	0.01692	0.02331	0.02331	0.02331	0.02331	0.01827
32	0.15360	0.09216	0.08370	0.08262	0.07416	0.02412	0.02115	0.01908	0.01908	0.01692	0.02331	0.02331	0.02331	0.02331	0.01827
33	0.15360	0.09216	0.08370	0.07209	0.06354	0.01989	0.01863	0.01485	0.01269	0.01269	0.01908	0.01908	0.01908	0.01908	0.01395
34	0.15360	0.09216	0.07905	0.06809	0.06001	0.01879	0.01760	0.01403	0.01199	0.01199	0.01802	0.01802	0.01802	0.01802	0.01318
35	0.12800	0.09216	0.07905	0.06809	0.06001	0.01879	0.01760	0.01403	0.01199	0.01199	0.01802	0.01802	0.01802	0.01802	0.01318
36	0.12288	0.09216	0.07905	0.06809	0.06001	0.01879	0.01760	0.01403	0.01199	0.01199	0.01802	0.01802	0.01802	0.01802	0.01318
37	0.11776	0.09216	0.07905	0.06809	0.06001	0.01879	0.01760	0.01403	0.01199	0.01199	0.01802	0.01802	0.01802	0.01802	0.01318
38	0.11264	0.09216	0.07905	0.06809	0.05007	0.01879	0.01598	0.01403	0.00799	0.00799	0.01403	0.01403	0.01403	0.01403	0.00918
39	0.10752	0.09216	0.07905	0.06809	0.05007	0.01879	0.01598	0.01403	0.00799	0.00799	0.01403	0.01403	0.01403	0.01403	0.00918

**Table A-7 Recommended Withdrawal Rates for Females**

Service	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Age															
40	0.10010	0.09009	0.07905	0.06809	0.05007	0.01879	0.01403	0.01403	0.00799	0.00723	0.00705	0.00705	0.00705	0.00705	0.00458
41	0.10010	0.09009	0.07905	0.06809	0.05007	0.01879	0.01403	0.01199	0.00799	0.00723	0.00705	0.00705	0.00705	0.00705	0.00458
42	0.10010	0.09009	0.07905	0.06809	0.05007	0.01879	0.01403	0.01199	0.00799	0.00723	0.00705	0.00705	0.00705	0.00705	0.00458
43	0.09770	0.08793	0.07506	0.06503	0.05007	0.01989	0.01403	0.01199	0.00799	0.00723	0.00705	0.00705	0.00705	0.00705	0.00458
44	0.09770	0.08793	0.07506	0.06503	0.04505	0.01782	0.01403	0.01199	0.00799	0.00723	0.00705	0.00705	0.00705	0.00705	0.00458
45	0.09770	0.08793	0.07506	0.06503	0.04505	0.01782	0.01403	0.01199	0.00799	0.00723	0.00705	0.00705	0.00705	0.00705	0.00458
46	0.09770	0.08793	0.07506	0.06503	0.04505	0.01782	0.01080	0.01199	0.00799	0.00723	0.00705	0.00533	0.00533	0.00533	0.00458
47	0.09770	0.08793	0.07506	0.06503	0.04505	0.01782	0.01080	0.01199	0.00799	0.00723	0.00705	0.00533	0.00533	0.00533	0.00458
48	0.09770	0.08793	0.07506	0.06503	0.04505	0.01782	0.01080	0.00799	0.00604	0.00400	0.00705	0.00533	0.00533	0.00533	0.00458
49	0.09770	0.08793	0.07506	0.06503	0.04505	0.01782	0.01080	0.00799	0.00604	0.00400	0.00705	0.00533	0.00533	0.00533	0.00458
50	0.09770	0.08793	0.07506	0.06503	0.04505	0.01782	0.01080	0.00799	0.00604	0.00400	0.00705	0.00533	0.00533	0.00533	0.00458
51	0.09770	0.08793	0.07506	0.06001	0.03706	0.01485	0.01080	0.00799	0.00604	0.00400	0.00705	0.00533	0.00533	0.00533	0.00458
52	0.09770	0.08793	0.07506	0.06001	0.03706	0.01485	0.00961	0.00799	0.00604	0.00400	0.00705	0.00533	0.00533	0.00533	0.00458
53	0.09770	0.08793	0.07506	0.06001	0.03706	0.01485	0.00961	0.00799	0.00604	0.00400	0.00533	0.00533	0.00533	0.00533	0.00458
54	0.09770	0.08793	0.07506	0.06001	0.03706	0.01485	0.00961	0.00799	0.00604	0.00400	0.00533	0.00533	0.00533	0.00533	0.00458
55	0.09770	0.08793	0.07506	0.06001	0.03706	0.01485	0.01199	0.01199	0.01199	0.01199	0.01238	0.01238	0.01238	0.01238	0.01163
56	0.09770	0.08793	0.07506	0.06001	0.03706	0.01485	0.01199	0.01199	0.01199	0.01199	0.01238	0.01238	0.01238	0.01238	0.01163
57	0.09770	0.08793	0.07506	0.06001	0.03706	0.01485	0.01199	0.01199	0.01199	0.01199	0.01238	0.01238	0.01238	0.01238	0.01163
58	0.09770	0.08793	0.07506	0.06001	0.03706	0.01485	0.01199	0.01199	0.01199	0.01199	0.01238	0.01238	0.01238	0.01238	0.01163
59	0.09770	0.08793	0.07506	0.06001	0.03706	0.01485	0.01199	0.01199	0.01199	0.01199	0.01238	0.01238	0.01238	0.01238	0.01163



**Table A-8**  
**Mortality Rates for Non Disabled Annuitants and Survivors**

<b>Age</b>	<b>Males Current</b>	<b>Males Recommended</b>	<b>Females Current</b>	<b>Females Recommended</b>
30	0.00107	0.00107	0.00034	0.00034
31	0.00120	0.00120	0.00040	0.00040
32	0.00135	0.00135	0.00046	0.00046
33	0.00152	0.00152	0.00051	0.00051
34	0.00169	0.00169	0.00056	0.00056
35	0.00186	0.00186	0.00061	0.00061
36	0.00202	0.00202	0.00065	0.00065
37	0.00217	0.00217	0.00070	0.00070
38	0.00230	0.00230	0.00075	0.00075
39	0.00241	0.00241	0.00080	0.00080
40	0.00253	0.00253	0.00088	0.00088
41	0.00266	0.00266	0.00096	0.00096
42	0.00280	0.00280	0.00106	0.00106
43	0.00297	0.00297	0.00116	0.00116
44	0.00317	0.00317	0.00128	0.00128
45	0.00340	0.00340	0.00138	0.00138
46	0.00361	0.00361	0.00149	0.00149
47	0.00384	0.00384	0.00160	0.00160
48	0.00409	0.00409	0.00173	0.00173
49	0.00435	0.00435	0.00188	0.00188
50	0.00462	0.00462	0.00204	0.00204
51	0.00474	0.00474	0.00216	0.00216
52	0.00480	0.00480	0.00237	0.00237
53	0.00487	0.00487	0.00263	0.00263
54	0.00493	0.00493	0.00294	0.00294
55	0.00507	0.00507	0.00331	0.00328
56	0.00530	0.00530	0.00374	0.00363
57	0.00562	0.00562	0.00421	0.00400
58	0.00606	0.00606	0.00473	0.00440
59	0.00658	0.00658	0.00531	0.00484
60	0.00720	0.00720	0.00596	0.00530
61	0.00798	0.00798	0.00665	0.00585

**Table A-8**  
**Mortality Rates for Non Disabled Annuitants and Survivors**

<b>Age</b>	<b>Males Current</b>	<b>Males Recommended</b>	<b>Females Current</b>	<b>Females Recommended</b>
62	0.00879	0.00879	0.00739	0.00643
63	0.00978	0.00978	0.00818	0.00703
64	0.01083	0.01072	0.00903	0.00767
65	0.01199	0.01175	0.00996	0.00846
66	0.01339	0.01299	0.01096	0.00932
67	0.01482	0.01423	0.01205	0.01024
68	0.01626	0.01545	0.01323	0.01125
69	0.01796	0.01706	0.01456	0.01252
70	0.01968	0.01869	0.01608	0.01399
71	0.02177	0.02068	0.01771	0.01558
72	0.02417	0.02297	0.01969	0.01753
73	0.02693	0.02558	0.02172	0.01954
74	0.03004	0.02854	0.02407	0.02190
75	0.03380	0.03211	0.02636	0.02425
76	0.03767	0.03579	0.02904	0.02701
77	0.04224	0.04013	0.03224	0.03031
78	0.04732	0.04496	0.03554	0.03376
79	0.05302	0.05037	0.03924	0.03728
80	0.05940	0.05643	0.04337	0.04120
81	0.06702	0.06366	0.04801	0.04560
82	0.07548	0.07170	0.05322	0.05056
83	0.08413	0.07993	0.05909	0.05614
84	0.09433	0.08961	0.06572	0.06243
85	0.10470	0.09947	0.07381	0.07012
86	0.11609	0.11028	0.08298	0.07966
87	0.12965	0.12317	0.09330	0.09050
88	0.14467	0.13744	0.10392	0.10184
89	0.15988	0.15189	0.11632	0.11516
90	0.17762	0.16874	0.12856	0.12856
91	0.19347	0.18573	0.14117	0.14117
92	0.21146	0.20512	0.15388	0.15388
93	0.22811	0.22355	0.16773	0.16773
94	0.24474	0.24229	0.17990	0.17990

**Table A-8**  
**Mortality Rates for Non Disabled Annuitants and Survivors**

<b>Age</b>	<b>Males Current</b>	<b>Males Recommended</b>	<b>Females Current</b>	<b>Females Recommended</b>
95	0.26324	0.26324	0.19142	0.19142
96	0.27939	0.27939	0.20212	0.20212
97	0.29509	0.29509	0.21352	0.21352
98	0.31278	0.31278	0.22216	0.22216
99	0.32758	0.32758	0.22954	0.22954
100	0.34181	0.34181	0.23557	0.23557
101	0.35863	0.35863	0.24483	0.24483
102	0.37169	0.37169	0.25450	0.25450
103	0.38304	0.38304	0.26604	0.26604
104	0.39200	0.39200	0.27906	0.27906
105	0.39789	0.39789	0.29312	0.29312
106	0.40000	0.40000	0.30781	0.30781
107	0.40000	0.40000	0.32273	0.32273
108	0.40000	0.40000	0.33744	0.33744
109	0.40000	0.40000	0.35154	0.35154
110	0.40000	0.40000	0.36462	0.36462
111	0.40000	0.40000	0.37625	0.37625
112	0.40000	0.40000	0.38602	0.38602
113	0.40000	0.40000	0.39351	0.39351
114	0.40000	0.40000	0.39831	0.39831
115	0.40000	0.40000	0.40000	0.40000
116	0.40000	0.40000	0.40000	0.40000
117	0.40000	0.40000	0.40000	0.40000
118	0.40000	0.40000	0.40000	0.40000
119	0.40000	0.40000	0.40000	0.40000
120	1.00000	1.00000	1.00000	1.00000

**Table A-9**  
**Mortality Rates for Disabled Annuitants**

<b>Age</b>	<b>Males Current</b>	<b>Males Recommended</b>	<b>Females Current</b>	<b>Females Recommended</b>
30	0.02168	0.02060	0.00687	0.00739
31	0.02168	0.02060	0.00699	0.00751
32	0.02168	0.02060	0.00699	0.00751
33	0.02168	0.02060	0.00693	0.00745
34	0.02168	0.02060	0.00687	0.00739
35	0.02168	0.02060	0.00682	0.00733
36	0.02168	0.02060	0.00676	0.00727
37	0.02168	0.02060	0.00671	0.00721
38	0.02151	0.02043	0.00666	0.00715
39	0.02134	0.02027	0.00660	0.00710
40	0.02117	0.02011	0.00660	0.00710
41	0.02100	0.01995	0.00660	0.00710
42	0.02083	0.01979	0.00660	0.00710
43	0.02066	0.01963	0.00660	0.00710
44	0.02049	0.01947	0.00660	0.00710
45	0.02033	0.01931	0.00655	0.00704
46	0.02130	0.02024	0.00714	0.00767
47	0.02226	0.02115	0.00775	0.00833
48	0.02321	0.02205	0.00845	0.00909
49	0.02414	0.02293	0.00920	0.00989
50	0.02506	0.02380	0.01006	0.01081
51	0.02596	0.02466	0.01097	0.01179
52	0.02685	0.02551	0.01202	0.01292
53	0.02796	0.02656	0.01313	0.01412
54	0.02906	0.02760	0.01430	0.01537
55	0.03040	0.02888	0.01551	0.01668
56	0.03176	0.03018	0.01677	0.01803
57	0.03315	0.03149	0.01792	0.01927
58	0.03457	0.03284	0.01894	0.02036
59	0.03575	0.03396	0.01995	0.02145

**Table A-9**  
**Mortality Rates for Disabled Annuitants**

Age	Males	Males	Females	Females
	Current	Recommended	Current	Recommended
60	0.03695	0.03511	0.02098	0.02255
61	0.03852	0.03660	0.02203	0.02369
62	0.03986	0.03787	0.02313	0.02487
63	0.04162	0.03953	0.02430	0.02612
64	0.04315	0.04100	0.02555	0.02747
65	0.04482	0.04258	0.02692	0.02894
66	0.04702	0.04467	0.02843	0.03056
67	0.04904	0.04659	0.03009	0.03235
68	0.05084	0.04830	0.03193	0.03432
69	0.05325	0.05059	0.03395	0.03649
70	0.05546	0.05268	0.03616	0.03887
71	0.05834	0.05543	0.03825	0.04112
72	0.06150	0.05843	0.04084	0.04390
73	0.06495	0.06170	0.04327	0.04651
74	0.06869	0.06525	0.04622	0.04969
75	0.07331	0.06965	0.04898	0.05265
76	0.07768	0.07379	0.05231	0.05623
77	0.08299	0.07884	0.05629	0.06051
78	0.08865	0.08422	0.06007	0.06458
79	0.09464	0.08990	0.06409	0.06889
80	0.10092	0.09588	0.06836	0.07349
81	0.10748	0.10211	0.07292	0.07839
82	0.11429	0.10858	0.07780	0.08364
83	0.12036	0.11434	0.08304	0.08927
84	0.12755	0.12117	0.08867	0.09532
85	0.13387	0.12717	0.09549	0.10265
86	0.14027	0.13325	0.10289	0.11061
87	0.14794	0.14054	0.11090	0.11922
88	0.15581	0.14802	0.11860	0.12750
89	0.16258	0.15445	0.12786	0.13745
90	0.17762	0.16874	0.13672	0.14698
91	0.19347	0.18379	0.14614	0.15710

**Table A-9**  
**Mortality Rates for Disabled Annuitants**

Age	Males	Males	Females	Females
	Current	Recommended	Current	Recommended
92	0.21146	0.20089	0.15613	0.16784
93	0.22811	0.21671	0.16773	0.18030
94	0.24474	0.23250	0.17990	0.19339
95	0.26324	0.25008	0.19142	0.20578
96	0.27939	0.26542	0.20212	0.21727
97	0.29509	0.28033	0.21352	0.22954
98	0.31278	0.29714	0.22216	0.23882
99	0.32758	0.31120	0.22954	0.24676
100	0.34181	0.32472	0.23557	0.25324
101	0.35863	0.34070	0.24483	0.26320
102	0.37169	0.35310	0.25450	0.27359
103	0.38304	0.36389	0.26604	0.28600
104	0.39200	0.37240	0.27906	0.29998
105	0.39789	0.37799	0.29312	0.31510
106	0.40000	0.40000	0.30781	0.33090
107	0.40000	0.40000	0.32273	0.34693
108	0.40000	0.40000	0.33744	0.36275
109	0.40000	0.40000	0.35154	0.37791
110	0.40000	0.40000	0.36462	0.39196
111	0.40000	0.40000	0.37625	0.37625
112	0.40000	0.40000	0.38602	0.38602
113	0.40000	0.40000	0.39351	0.39351
114	0.40000	0.40000	0.39831	0.39831
115	0.40000	0.40000	0.40000	0.40000
116	0.40000	0.40000	0.40000	0.40000
117	0.40000	0.40000	0.40000	0.40000
118	0.40000	0.40000	0.40000	0.40000
119	0.40000	0.40000	0.40000	0.40000
120	1.00000	1.00000	1.00000	1.00000

<b>Table A-10</b> <b>Superannuation Retirement Rates for State Police</b> <b>Males &amp; Females</b>		
<b>Service</b>	<b>Current</b>	<b>Males &amp; Females Recommended</b>
20	0.04700	0.05000
21	0.01180	0.05000
22	0.01180	0.05000
23	0.01180	0.05000
24	0.01180	0.15000
25	0.35270	0.50000
26	0.19990	0.20000
27	0.18810	0.20000
28	0.18810	0.20000
29	0.18810	0.20000
30	0.18810	0.30000
31	0.18810	0.20000
32	0.18810	0.40000
33	0.18810	0.40000
34	0.35270	0.40000
35	0.48210	0.50000
36	0.48210	0.50000
37	0.48210	0.50000
38	0.48210	0.50000
39	0.48210	0.50000
40	1.00000	1.00000

**Table A-11  
Superannuation Retirement Rates for Hazardous Duty  
Employees**

<b>Age</b>	<b>Males &amp; Females Current</b>	<b>Males &amp; Females Recommended</b>
49	0.07180	0.07000
50	0.07180	0.07000
51	0.07180	0.07000
52	0.07180	0.07000
53	0.07180	0.07000
54	0.07180	0.07000
55	0.07180	0.07000
56	0.07180	0.07000
57	0.07180	0.07000
58	0.07180	0.07000
59	0.07180	0.10000
60	0.07180	0.12000
61	0.14360	0.16000
62	0.57430	0.30000
63	0.44500	0.15000
64	0.50250	0.15000
65	0.71780	0.25000
66 to 75	0.34460	0.25000
76 to 79	0.34460	0.35000
80	1.00000	1.00000



**Table A-12**  
**Early Retirement Rates for State Police and Hazardous Duty**  
**Employees**

	<b>Males &amp; Females</b>	<b>Males &amp; Females</b>
	<b>Current</b>	<b>Recommended</b>
<b>Age</b>		
17 to 49	0.0093	0.0080
50 to 59	0.0000	0.0000

**Table A-13**  
**Withdrawal Rates for State Police and Hazardous Duty Employees**

	<b>Males &amp; Females</b>	<b>Males &amp; Females</b>
	<b>Current</b>	<b>Recommended</b>
<b>Service</b>		
0	0.0560	0.1500
1	0.0560	0.0500
2	0.0373	0.0300
3	0.0280	0.0250
4	0.0280	0.0150
5	0.0187	0.0090
6	0.0187	0.0065
7	0.0093	0.0055
8	0.0093	0.0040
9	0.0093	0.0025
10	0.0093	0.0020

<b>Table A-14</b>		
<b>Superannuation Retirement Rates for Legislators</b>		
<b>Age</b>	<b>Males &amp; Females</b>	<b>Males &amp; Females</b>
	<b>Current</b>	<b>Recommended</b>
49	0.0125	0.05000
50	0.0125	0.05000
51	0.0188	0.05000
52	0.0188	0.05000
53	0.0188	0.05000
54	0.0188	0.07500
55	0.0188	0.07500
56	0.0188	0.07500
57	0.0251	0.07500
58	0.0251	0.07500
59	0.0251	0.12000
60	0.0251	0.12000
61	0.0314	0.12000
62	0.0314	0.12000
63	0.0314	0.12000
64	0.0376	0.25000
65	0.0376	0.25000
66	0.0376	0.25000
67	0.0439	0.25000
68	0.0439	0.25000
69	0.0502	0.25000
70	0.0502	0.25000
71	0.0564	0.25000
72	0.0564	0.25000
73 +	0.0627	0.25000

**Table A-15**  
**Early Retirement Rates for Legislators**

Age	Males & Females Current	Males & Females Recommended
17 to 49	0.0386	0.0300
50 to 59	0.0000	0.0000

**Table A-16**  
**Withdrawal Rates for Legislators**

Service	Males & Females Current	Males & Females Recommended
0	-	0.05000
1	0.03860	0.05000
2	0.03860	0.05000
3	0.03860	0.10000
4	0.03860	0.05000
5	0.03860	0.10000
6	0.03860	0.05000
7	0.03860	0.05000
8	0.03860	0.05000
9	0.03860	0.05000
10	0.03860	0.01250

<b>Table A-17</b> <b>Superannuation Retirement Rates for Judicial Officers</b> <b>Males &amp; Females</b>		
Age	Current	Recommended
49 to 58	0.0227	0.0227
59	0.0227	0.1000
60	0.0227	0.0500
61	0.0227	0.0500
62	0.0227	0.0500
63	0.0227	0.0500
64	0.0227	0.0500
65	0.0227	0.1000
66	0.0227	0.1000
67	0.0227	0.1000
68	0.0227	0.1000
69	0.0227	0.5000
70	1.0000	1.0000

<b>Table A-18</b> <b>Early Retirement Rates for Judicial Officers</b> <b>Males &amp; Females</b>		
Age	Current	Recommended
17 to 49	0.00240	0.00500
50 to 59	0.00240	0.01200

**Table A-19**  
**Withdrawal Rates for Judicial Officers**  
**Males & Females**                      **Males & Females**  
**Service**                                      **Current**                                      **Recommended**

0	0.0002	0.0200
1	0.0024	0.0200
2	0.0024	0.0100
3	0.0024	0.0100
4	0.0024	0.0100
5	0.0024	0.0050
6	0.0024	0.0045
7	0.0024	0.0040
8	0.0024	0.0035
9	0.0024	0.0030
10	0.0024	0.0025

**Table A-20**  
**Early Retirement Rates for Class A-3 and Class A-4 Active**  
**General Employees with 15 or more Years of Service**

<b>Ages</b>	<b>Females Recommended</b>	<b>Males Recommended</b>
31 to 46	0.01500	0.01500
47	0.02000	0.02000
48	0.02000	0.02000
49	0.02000	0.02000
50	0.02000	0.02000
51	0.03000	0.03000
52	0.04000	0.04000
53	0.04500	0.04500
54	0.05000	0.05000
55	0.05500	0.05500
56	0.05500	0.05500
57	0.05500	0.05500
58	0.05500	0.05500
59	0.05500	0.05500
60	0.05500	0.05500
61	0.06000	0.06000
62	0.20000	0.20000
63	0.10000	0.10000
64	0.15000	0.15000
65	0.00000	0.00000

**Table A-21**  
**Recommended Superannuation Retirement Rates**  
**for Class A-3 and Class A-4 General Employees**

Age	Recommended Superannuation Retirement Rates	Recommended Superannuation Retirement Rates
	Male	Female
55	15%	15%
56	16%	16%
57	17%	17%
58	18%	18%
59	19%	19%
60	20%	20%
61	20%	20%
62	25%	25%
63	20%	20%
64	20%	20%
65	25%	25%
66 to 79	20%	20%
80	100%	100%



**March 2015 Board Presentation –  
Review of Investment Return  
Assumption to be Used for December  
31, 2014 Actuarial Valuation**



Date: March 3, 2015

To: Pennsylvania State Employees' Retirement Board  
cc: Mr. David E. Durbin

From: Brent Mowery, FSA, EA

Re: Review of Investment Return Assumption for the  
December 31, 2014 Actuarial Valuation of the State  
Employees' Retirement System (SERS)

## **I. Introduction & Executive Summary**

It's now been three years since the SERS Board's last action to revise the investment return assumption used for the annual SERS actuarial valuation. Many of you may recall, in early 2012, with the calendar 2011 investment return coming in at only 2.6% (and the 2008 return still fresh in everyone's memory), the Board, with Hay Group's assistance, took a hard look at the 8.0% annual return assumption then in use. After significant discussions at both the March and May 2012 Board meetings, the Board decided to lower this annual return assumption from 8.0% (last used for the December 31, 2010 valuation) to 7.5% (first used for the December 31, 2011 valuation and since retained for the December 31, 2012 and December 31, 2013 valuations).

Happily, the SERS fund earnings since then have been strong, with 12.0% earned in calendar 2012, 13.6% earned in calendar 2013 and, preliminarily, approximately 6.4% earned in 2014, for a three-year average compounded annual return of almost 10.6%, exceeding the 7.5% annual return assumption by more than 3% per year. Based upon these three years (2012, 2013 and 2014) of results, Hay Group's review of historical SERS returns and our understanding of RVKuhns' future return expectations based upon the asset allocations scheduled for the SERS investment portfolio, as well as our observations regarding the investment return assumptions being used by other large U.S. public pension plans, Hay Group is pleased to report that we consider your current 7.5% annual investment return assumption to be reasonable and appropriate for use in Hay Group's December 31, 2014 actuarial valuation (which is currently in process).

The remainder of this memorandum includes:

- To raise the Board's awareness (meant as a review for longstanding members and a brief actuarial education session for newer members) of the impact that the actuarial investment return assumption has on employer contribution requirements to fund SERS, Hay Group has included in Section II below projections of future SERS costs under various investment return scenarios.
- In Sections III, IV and V below, Hay Group has included our review and commentary in support of the continued use of your current 7.5% annual investment return assumption for purposes of the December 31, 2014 actuarial valuation. It should be noted that, while economic conditions have improved significantly since the 2008 global financial crisis, SERS continues to face challenges as a result of economic uncertainties and volatility, as well as a need to increase over time the liquidity of the SERS portfolio. Therefore, it will remain important for us to monitor this assumption and to share with you our thoughts and observations in connection with each of our annual actuarial valuations.

## II. Estimated 12/31/14 Actuarial Valuation Results & Future Cost Projections

Although we have not yet completed our December 31, 2014 actuarial valuation, using our December 31, 2013 census data and preliminary asset information as of December 31, 2014, we have performed estimates of the December 31, 2013 and subsequent valuation results based upon alternative investment return assumptions. The table on the next page shows the projected employer contribution rates under (i) three (3) different assumed annual investment returns (or liability interest rates), namely 7.5%, 7.25%, and 7% and (ii) three (3) different actual future annual return scenarios, namely 8%, 7.5%, and 7% per annum.

The numbers highlighted in **green** are the projected employer contribution rates during the first year that the Act 120 contribution collars are not expected to apply.

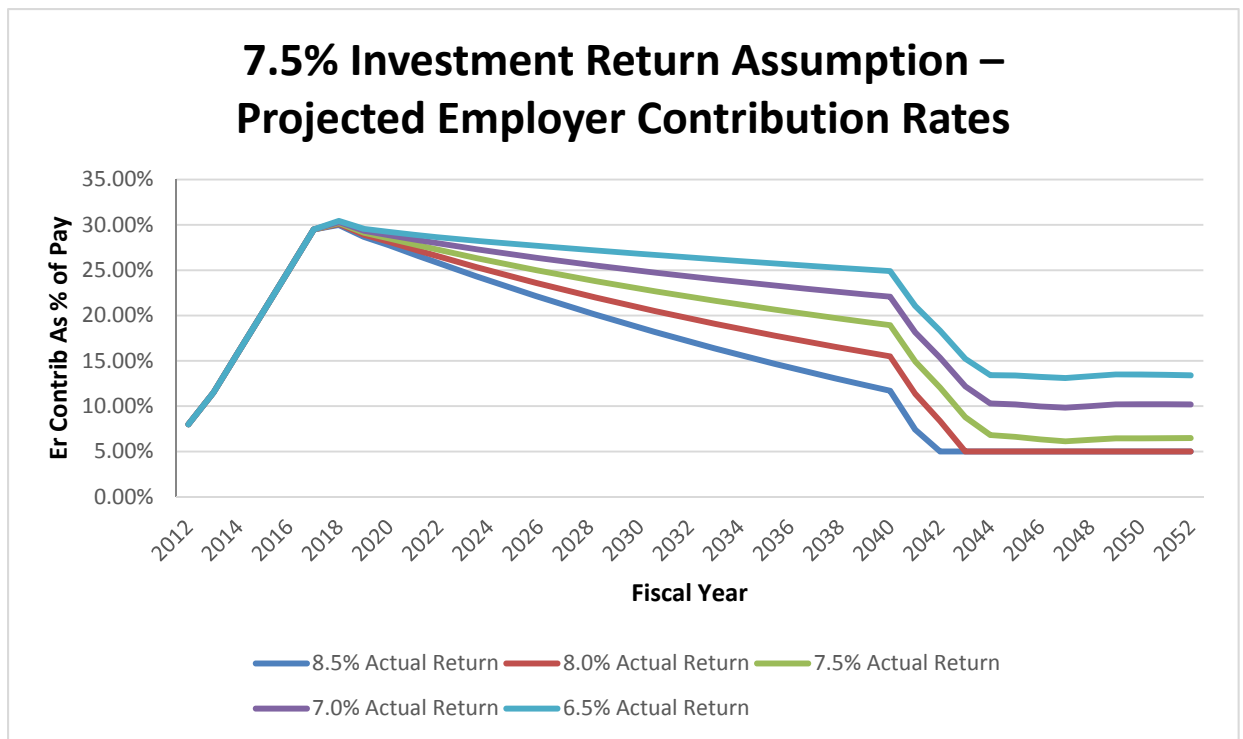
**SERS Projected Employer Contribution Rates (Expressed as a Percentage of Projected Covered Payroll)  
Based Upon Various Assumed & Actual Future Annual Investment Returns**

<u>Valuation</u> <u>Date</u>	<u>Assumed Return:</u> <u>Fiscal Year</u>	<u>7.5% Assumed</u>			<u>7.25% Assumed</u>			<u>7% Assumed</u>		
		<u>Actual Return:</u> <u>Actual</u>	<u>Actual</u>	<u>Actual</u>	<u>Actual</u>	<u>Actual</u>	<u>Actual</u>	<u>Actual</u>	<u>Actual</u>	<u>Actual</u>
12/31/2010	2011/2012	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%
12/31/2011	2012/2013	11.50%	11.50%	11.50%	11.50%	11.50%	11.50%	11.50%	11.50%	11.50%
12/31/2012	2013/2014	16.00%	16.00%	16.00%	16.00%	16.00%	16.00%	16.00%	16.00%	16.00%
12/31/2013	2014/2015	20.50%	20.50%	20.50%	20.50%	20.50%	20.50%	20.50%	20.50%	20.50%
12/31/2014	2015/2016	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%
12/31/2015	2016/2017	29.50%	29.50%	29.50%	29.50%	29.50%	29.50%	29.50%	29.50%	29.50%
12/31/2016	2017/2018	30.09%	30.20%	30.31%	31.71%	31.81%	31.92%	33.23%	33.34%	33.44%
12/31/2017	2018/2019	28.91%	29.13%	29.35%	30.48%	30.70%	30.91%	31.96%	32.17%	32.38%
12/31/2018	2019/2020	28.14%	28.50%	28.86%	29.58%	29.94%	30.29%	30.95%	31.30%	31.64%
12/31/2019	2020/2021	27.29%	27.84%	28.37%	28.62%	29.15%	29.68%	29.88%	30.40%	30.91%
12/31/2020	2021/2022	26.48%	27.21%	27.92%	27.69%	28.40%	29.10%	28.84%	29.54%	30.22%
12/31/2021	2022/2023	25.71%	26.61%	27.50%	26.80%	27.69%	28.56%	27.84%	28.71%	29.56%
12/31/2022	2023/2024	24.96%	26.04%	27.10%	25.94%	27.00%	28.04%	26.87%	27.91%	28.93%
12/31/2023	2024/2025	24.23%	25.49%	26.71%	25.09%	26.34%	27.54%	25.92%	27.14%	28.33%
12/31/2024	2025/2026	23.52%	24.95%	26.34%	24.27%	25.69%	27.06%	24.99%	26.39%	27.74%
12/31/2025	2026/2027	22.83%	24.43%	25.97%	23.48%	25.06%	26.59%	24.09%	25.66%	27.17%
12/31/2026	2027/2028	22.16%	23.93%	25.62%	22.70%	24.46%	26.14%	23.21%	24.95%	26.61%
12/31/2027	2028/2029	21.51%	23.44%	25.28%	21.94%	23.87%	25.69%	22.35%	24.26%	26.07%
12/31/2028	2029/2030	20.88%	22.97%	24.94%	21.21%	23.29%	25.27%	21.51%	23.59%	25.55%
12/31/2029	2030/2031	20.27%	22.51%	24.62%	20.50%	22.74%	24.85%	20.70%	22.94%	25.05%
12/31/2030	2031/2032	19.67%	22.06%	24.30%	19.80%	22.20%	24.45%	19.90%	22.30%	24.56%
12/31/2031	2032/2033	19.10%	21.63%	24.00%	19.13%	21.67%	24.06%	19.13%	21.69%	24.08%
12/31/2032	2033/2034	18.53%	21.21%	23.70%	18.47%	21.17%	23.68%	18.38%	21.09%	23.62%
12/31/2033	2034/2035	17.99%	20.81%	23.41%	17.83%	20.67%	23.31%	17.65%	20.52%	23.17%
12/31/2034	2035/2036	17.46%	20.41%	23.13%	17.21%	20.20%	22.95%	16.94%	19.95%	22.74%

Hay Group measures the SERS liabilities and costs on the basis of the actuarial assumptions that apply as of each valuation date. The one actuarial assumption that has the greatest impact on valuation results is the annual investment return assumption. For a given assumed annual investment return, (i) consistently lower actual investment returns over time lead to relatively higher levels of required annual employer contributions and (ii) consistently higher actual investment returns over time lead to relatively lower levels of required contributions.

This is illustrated in the graph below, as follows:

- The assumed annual investment return for all years is 7.5 percent.
- The lines on the graph are the resulting projected employer contribution rates if:
  - Annual investment returns are 6.5% every year, beginning in calendar 2015
  - Annual investment returns are 7% every year, beginning in calendar 2015
  - Annual investment returns are 7.5% every year, beginning in calendar 2015
  - Annual investment returns are 8% every year, beginning in calendar 2015
  - Annual investment returns are 8.5% every year, beginning in calendar 2015



Such actual-to-expected investment return deviations have a significant cumulative impact on employer contribution rates. For example, after the passage of approximately 25 years, the employer contribution rate under the 6.5% actual return scenario is higher by more than 12 percent of payroll than the employer contribution rate under the 8.5% actual return scenario.

**III. SERS Historical Investment Results (As Presented Below under **Nominal Investment Return**)**  
*(Note: See Graphical Presentation of These Returns on Last Page of This Memorandum)*

Comparison of Annual Rates of Growth					
Year	Inflation	Investment Return		Salary Growth	
		Nominal	Real	Nominal	Real
1995	2.5	25.5	22.4	3.8	1.2
1996	3.3	15.9	12.2	2.0	(1.3)
1997	1.7	18.0	16.0	3.0	1.3
1998	1.6	16.3	14.5	3.0	1.4
1999	2.7	19.9	16.8	3.0	0.3
2000	3.4	2.2	(1.1)	3.0	(0.4)
2001	1.6	(7.9)	(9.3)	3.3	1.7
2002	2.4	(10.9)	(13.0)	3.5	1.1
2003	1.9	24.3	22.0	2.0	0.1
2004	3.3	15.1	11.4	1.9	(1.4)
2005	3.4	14.5	10.7	3.0	(0.4)
2006	2.5	16.4	13.6	3.5	1.0
2007	4.1	17.2	12.6	2.8	(1.2)
2008	0.1	(28.7)	(28.8)	3.0	2.9
2009	2.7	9.1	6.2	3.0	0.3
2010	1.5	11.9	10.2	3.0	1.5
2011	3.0	2.7	(0.3)	3.0	0.0
2012	1.7	12.0	10.1	1.0	(0.7)
2013	1.5	13.6	11.9	2.8	1.3
2014	0.8	6.4(Est)	5.6	TBD	TBD
<b>Average 1995-2014</b>	<b>2.3%(Est)</b>	<b>8.8%(Est)</b>	<b>6.4%(Est)</b>	<b>2.8%(Est)</b>	<b>0.5%(Est)</b>

Other relevant historical investment return statistics for SERS include the following:

<u>Time Period</u>	<u>Average Compounded Annual Return</u>
2010-2014 (5 years)	9.2%
2008-2014 (7 years)	2.8%
2005-2014 (10 years)	6.6%
2000-2014 (15 years)	5.6%

#### IV. Future SERS Investment Returns - Hay Group & R. V. Kuhns Outlook

It is important (and a widely recognized best practice in pension funding) for the system actuary and general investment consultant to work as a team on an ongoing basis in connection with the annual determination of an appropriate investment return assumption for the actuarial valuation. Hay Group's discussions and information exchange with R. V. Kuhns (RVK) over the past month included RVK's preparation of the table below, which contains SERS' current interim and long-term target allocations alongside RVK's 2015 capital market assumptions for each asset class. These assumptions are in nominal terms. That is, they include inflation (at 2.5% per year, as listed at the bottom of the table).

Asset Class	Current Transition Target Allocation	Long-Term Target Allocation	Arithmetic Return Assumption	Standard Deviation Assumption
Alternative Investments	20%	15%	10.50%	26.00%
Global Equity	37%	40%	7.80%	18.35%
Real Assets	17%	17%	7.09%	12.74%
Diversifying Assets	8%	10%	7.25%	13.00%
Fixed Income	15%	15%	3.50%	6.00%
Liquidity Reserve	3%	3%	2.50%	3.50%
<i>RVK U.S. Inflation Assumption</i>	<i>N/A</i>	<i>N/A</i>	<i>2.50%</i>	<i>3.00%</i>

Largely due to the longer future time horizon underlying the actuary's economic assumptions (30 to 40 or more years) versus the horizon underlying the investment consultant's investment return assumptions (5 to 10 years), Hay Group assumes future U.S. inflation will be at a rate of 2.75% per year, whereas RVK assumes (per above) a rate of 2.50% per year.

Using the above RVK information to calculate a weighted average expected return, we determined that:

- Based upon the Transition Target Allocation:
  - an annual return of 7.37% is expected; however,
  - after adding the 0.25% inflation assumption difference to this return, we arrive at **7.62%**.
- Based upon the Long-Term Target Allocation:
  - an annual return of 7.23% is expected; however,
  - after adding the 0.25% inflation assumption difference to this return, we arrive at **7.48%**.

Both of these resulting expected return levels (7.62% & 7.48%) are close to the 7.50% investment return assumption Hay Group has recommended for the December 31, 2014 actuarial valuation.

## V. Investment Return Assumptions Used by Other Large Public Plans

Another important factor for the Board to keep in mind is the range of investment return assumptions being used in actuarial valuations of other large public pension systems in the U.S. The Public Fund Survey conducted by the National Association of State Retirement Administrators (NASRA) releases such information each year regarding 126 large public pension plans. The systems in this survey reflect about 85% of the assets and participants in the entire state and local government pension community. Since 2008, more than half of these plans have reduced their investment return assumption. As of October 2014, the median return assumption is 7.75 percent.

The table below is a summary of the annual investment return assumptions in use by the 126 plans in the survey, including the distributions as of December 2011, December 2013 and October 2014. Note that the number of plans with assumed returns of 7.5 percent or lower has increased from 26 of 126 plans (21 percent of the total) at the end of 2011 to 52 of 126 plans (41 percent of the total) as of October 2014.

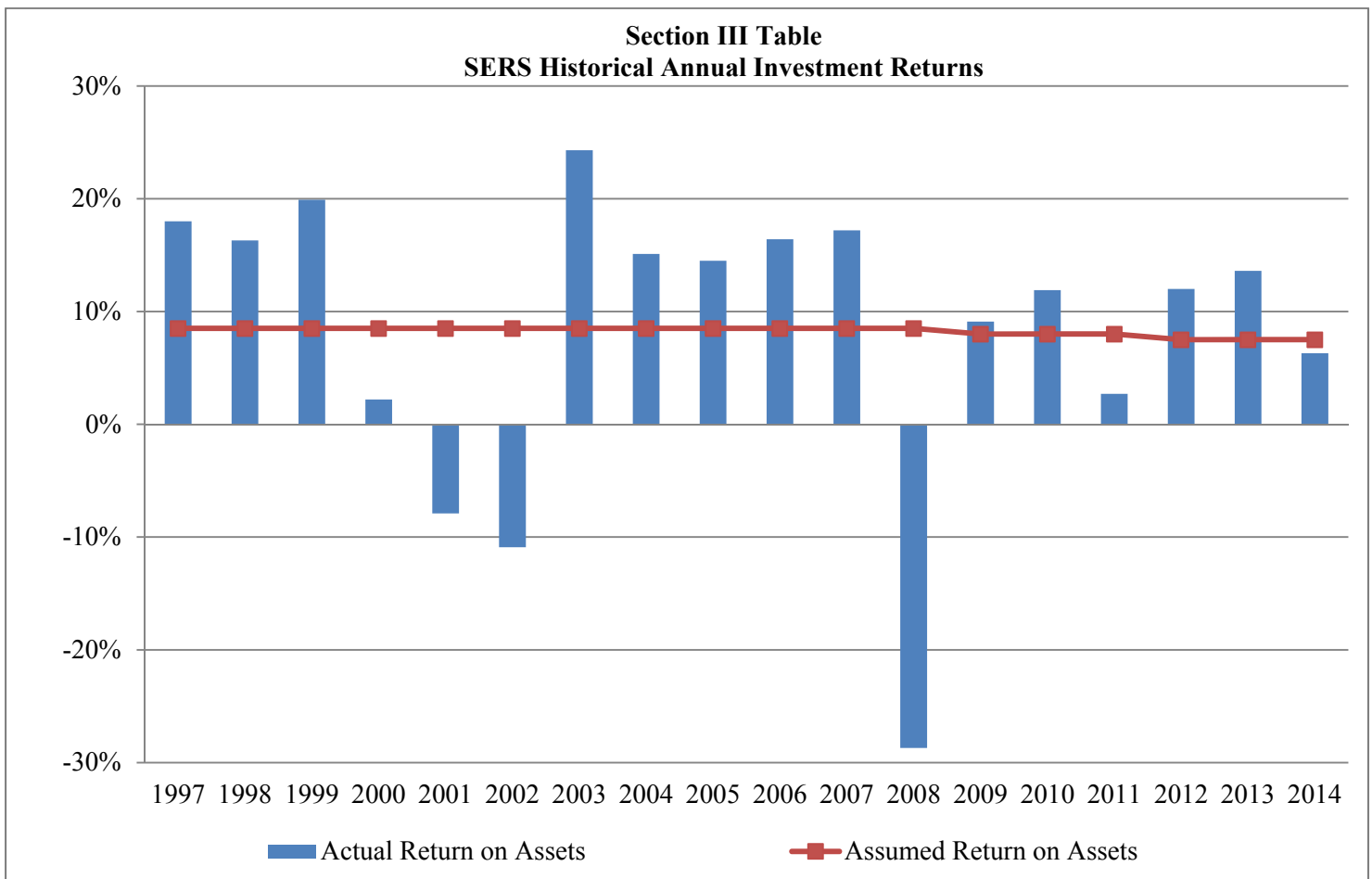
Assumed Investment Return	Number of Plans	Number of Plans	Number of Plans
	December 2011	December 2013	October 2014
<b><u>8.00% or Higher</u></b>			
8.50%	10	2	2
8.40%	0	0	5
8.25%	12	1	1
8.10%	1	1	1
8.00%	47	45	36
<b><u>7.50% to 7.99%</u></b>			
7.95%	8	0	0
7.90%	1	11	10
7.85%	0	0	1
7.75%	21	17	14
7.70%	0	2	0
7.65%	0	0	3
7.58%	0	1	1
7.50%	17	30	34
	100 plans(79%) > 7.5%; 17 plans(14%) = 7.5%; 9 plans(7%) < 7.5%	80 plans(63%) > 7.5%; 30 plans(24%) = 7.5%; 16 plans(13%) < 7.5%	74 plans(59%) > 7.5%; 34 plans(27%) = 7.5%; 18 plans(14%) < 7.5%
<b><u>7.00% to 7.49%</u></b>			
7.25%	2	7	7
7.20%	1	1	1
7.125%	0	0	2
7.00%	6	4	4
<b><u>6.50% to 6.99%</u></b>			
6.75%	0	2	2
6.50%	0	2	2
Total Plans in Survey	126	126	126

**VI. Conclusion**

Hay Group will be providing a brief overview of the material included in this memorandum at your upcoming (March 11, 2015) meeting, and we will present our final December 31, 2014 actuarial valuation results at your April 29, 2015 meeting. Please contact me at (703) 841-3109 if you should have questions on any of this or if you feel we can provide you with additional relevant information.

For your information, this fall we will be undertaking our 18<sup>th</sup> Investigation of the Actuarial Experience of SERS, the in-depth study we perform every five years to review all our actuarial valuation assumptions (including mortality, salary increases, etc.). Our resulting assumption change recommendations will be presented to the Board in early 2016 for approval and implementation in the December 31, 2015 valuation.

**Graphical Presentation of SERS Historical Investment Returns**  
**(Nominal Investment Returns from Table in Section III Above)**



Assumed Return History: 8.5%: 1995-2007 Valuations; 8.0%: 2008-2010 Valuations; 7.5%: 2011 & Later Valuations





**Results of December 2015 Hay Group  
Review & Analysis of Senate Bill No.  
1082 and Variations Thereon,  
including:**

- **Actuarial Cost Note,**
- **Cost Projections,**
- **Summary Tables,**
- **Related Explanatory Materials**

December 14, 2015

Mr. David E. Durbin  
Executive Director  
State Employees' Retirement System  
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Re: Official Cost Estimates for Senate Bill (SB) 1082  
Printer's Number (PN) 1460 & Variations Thereon

Dear Dave:

This letter is in response to requests for Hay Group's official cost estimates relating to the following three pieces of proposed legislation:

1. SB 1082, PN 1460
2. SB 1082, PN 1460, as amended by Amendment A04826
3. SB 1082, PN 1460, as amended by Amendment A05049

On December 3, 2015, Hay Group issued an actuarial cost note in connection with a Consensus Side-by-Side Hybrid design proposed on December 1, 2015. This cost note, a copy of which is enclosed with this letter, included detailed information concerning the cost impact of several variations of a proposed new pension design for the Pennsylvania State Employees' Retirement System (SERS), one of which is very similar to all three of the designs proposed in the above-listed legislative proposals. The variation of the Consensus Side-by-Side Hybrid design described in our December 3<sup>rd</sup> note that greatly resembles the above legislative proposals is the one under which the decrease in the unfunded accrued liability (UAL) that results from the legislation would be funded using a 30-year, level dollar amortization. Therefore, also enclosed with this letter are the following schedules:

- Our projection table showing projected SERS costs through the end of FY 2052 under the 30-year, level dollar amortization version of the Consensus Side-by-Side Hybrid proposal and
- Our Summary Table showing a breakdown of the long-term cumulative savings/cost of each of the key components of the Consensus Side-by-Side Hybrid proposal.

#### **Clarifications Relating to Enclosed Actuarial Cost Note**

- Shortly after the issuance of our December 3<sup>rd</sup> actuarial cost note, a question was raised in connection with the Public Employee Retirement Commission's (PERC's) review of this actuarial cost note and related schedules. This question pertained to Hay Group's handling of one particular provision of the Consensus Side-by-Side Hybrid design proposal, which was not addressed in our December 3<sup>rd</sup> cost note. Specifically, we were asked if we were aware of this provision of the proposal and if we had considered the cost implications of it.

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December 14, 2015  
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Below , we describe the specific provision that was questioned and Hay Group's handling of it.

*Proposed Change to Benefit Provisions Applicable to Class A-3 & Class A-4 Members*

Under the Consensus Side-by-Side Hybrid proposal, in addition to the legacy Defined Benefit (DB) system member changes fully described on pages 2 and 3 of Hay Group's December 3, 2015 actuarial cost note, there would be a change, effective July 1, 2016, to make an actuarially cost neutral Option 4 lump sum withdrawal (of member contributions and statutory interest) available to Class A-3 and Class A-4 members of SERS upon their retirement. This option is not currently available to A-3 and A-4 members. For these two classes of members, the cost neutral Option 4 calculation would be applicable to all member contributions and statutory interest thereon, whether they occurred before or after the July 1, 2016 effective date.

As you know, from our communications on this matter the day after the issuance of our cost note, although this provision was not included in our cost note discussion of the specific elements of the proposed legislation, we were fully aware of this provision while performing our cost analyses, we confirmed that this provision, if enacted, would have no future cost impact on SERS and, as a result, we stand by our December 3, 2015 actuarial cost note and related schedules as issued.

- More recently, another aspect of our December 3<sup>rd</sup> actuarial cost note was identified as requiring clarification, as follows: While the second bullet on page 3 of our note indicated that the proposal would extend the new Shared-Risk and Shared-Gain provisions to members of Class AA and Class D-4, in fact, the proposal would extend both of these provisions to members of Classes A, E1 and E2 as well. This broad applicability of the Shared-Risk and Shared-Gain provisions (whereby both are extended to all SERS legacy DB member classes) is also included in all three versions of Senate Bill 1082 being addressed in this letter.

**SB 1082, PN 1460 (hereafter, SB 1082)**

SB 1082 differs from the Consensus Side-by-Side Hybrid proposal covered by our enclosed December 3, 2015 actuarial cost note with respect to one aspect:

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Whereas under the Consensus Side-by-Side Hybrid proposal, current Elected Officials would be mandatorily enrolled in the new side-by-side hybrid (DB system and DC plan) upon reelection on or after January 1, 2018, under SB 1082, current Elected Officials would have a one-time opportunity to petition for reinstatement into their current (pre-SB 1082) SERS DB system membership class upon reelection on or after January 1, 2018.

Hay Group has concluded that, based upon the small percentage of Elected Officials currently in the SERS active membership (about 0.25%, i.e., about 260 out of approximately 104,000) and our expectation that most of the affected Elected Officials will not opt in to their current membership class upon re-election, this “opt-in” provision would have no material impact on our overall cost estimates issued on December 3, 2015.

Therefore, the two enclosed cost estimate schedules are our official cost estimates for SB 1082, and they show the same cost estimate results as the schedules referenced in our December 3, 2015 actuarial cost note. That is, we estimate that, if SB 1082 were to become law, it would result in a cumulative savings relative to SERS’ current plan baseline projected costs through the end of FY 2052 of \$2,099.7 million (or \$2.0997 billion).

**SB 1082, PN 1460, as amended by Amendment A04826 (hereafter, SB 1082, A04826)**

SB 1082, A04826 differs from SB 1082 with respect to one aspect:

Whereas under SB 1082, it is proposed that the Act 120 employer contribution collar of 4.5% for FY 2016-17 be revised to 2.25%, SB 1082, A04826 proposes no change in any of the Act 120 employer contribution collars. Hay Group has prepared cost estimates for a variation of the Consensus Side-by-Side Hybrid proposal that called for no change to the Act 120 employer contribution collars and these estimates also serve as our official cost estimates of SB 1082, A04826. The details of these estimates are attached, as follows:

- Our projection table showing projected SERS costs through the end of FY 2052 under the 30-year, level dollar amortization, with No Change to the Act 120 Collars, version of this Side-by-Side Hybrid proposal and
- Our Summary Table showing a breakdown of the long-term cumulative savings/cost of each of the key components of this version of the Side-by-Side Hybrid proposal.

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That is, we estimate that, if SB 1082, A04826 were to become law, it would result in a cumulative savings relative to SERS' current plan baseline projected costs through the end of FY 2052 of \$2,275.4 million (or \$2.2754 billion).

**SB 1082, PN 1460, as amended by Amendment A05049 (hereafter, SB 1082, A05049)**

SB 1082, A05049 differs from SB 1082, A04826 with respect to one aspect:

Whereas under SB 1082, A04826, current Elected Officials would have a one-time opportunity to petition for reinstatement into their current (pre-SB 1082) SERS DB system membership class upon reelection on or after January 1, 2018, under SB 1082, A05049, current Elected Officials would be mandatorily enrolled in the new side-by-side hybrid (DB system and DC plan) upon reelection on or after January 1, 2018.

Since Hay Group concluded (as described above) that this "opt-in" provision would have no material impact on our overall cost estimates, our official cost estimates of SB 1082, A05049 are approximately the same as those presented above for SB 1082, A04826. That is, we estimate that, if SB 1082, A05049 were to become law, it would have approximately the same cost impact as if SB 1082, A04826 were to become law; namely, it would result in a cumulative savings relative to SERS' current plan baseline projected costs through the end of FY 2052 of \$2,275.4 million (or \$2.2754 billion).

**Important Notes**

Please note the following regarding our handling of the attached funding projections:

1. In performing our cost analyses and preparing the attachments to this letter, Hay Group has applied the proposed changes to current law as presented to us. We have not reviewed or opined on the legality of any aspect of these proposals.
2. Hay Group's past convention of showing results for employer cost projections such as these as percentages of payroll to two decimal places may be somewhat misleading. This level of precision is not really possible for estimates of this nature.
3. All of these projections are based upon the expectation that (i) for all years after 2014, the actual economic and demographic experience of SERS will be consistent with the



Mr. David E. Durbin  
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underlying actuarial valuation assumptions and (ii) all employer contribution amounts shown in the "Expected FY Contribution" columns will, in fact, be contributed.

4. The attached projection schedules include a particularly important column of information that may warrant further explanation: "Cumulative (Savings) / Cost Relative to Baseline" shows the projected cumulative cost or savings in employer contributions (in millions of dollars) that would result under the stated legislative proposal versus under the current law (Baseline).
5. The cost estimates included herein were based upon our December 31, 2014 actuarial valuation results, including the underlying census data, assets and actuarial assumptions.

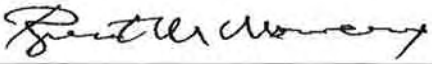
**Actuarial Certification**


To the best of our knowledge, the information we are presenting herein is complete and accurate and all costs and liabilities have been determined in conformance with generally accepted actuarial principles and on the basis of actuarial assumptions and methods which are reasonable (taking into account the past experience of SERS and reasonable expectations) and which represent our best estimate of anticipated experience under the plan.

The actuaries certifying to these valuations and related actuarial projections are members of the Society of Actuaries or other professional actuarial organizations, and meet the General Qualification Standards of the American Academy of Actuaries for purposes of issuing Statements of Actuarial Opinion.

Please let us know if you have any questions on any of this.

Respectfully submitted,  
Hay Group, Inc.

By:   
Brent M. Mowery, F.S.A.  
Member American Academy of Actuaries  
Enrolled Actuary No. 14-3885

By:   
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**Actuarial Cost Note -  
Projected Impact of Consensus Side-by-Side Hybrid Pension Design  
Proposed on December 1, 2015**

As requested, in connection with the Consensus Side-by-Side Hybrid pension design proposed on December 1, 2015, we have performed cost projections to approximate the impact on the future funding of the Pennsylvania State Employees' Retirement System (SERS) if this proposal were to become law. This proposal calls for a hybrid defined benefit (DB)/defined contribution (DC) plan design for SERS, to take the place of the current DB only system. That is, under this proposal (hereafter referred to as the "Consensus Hybrid proposal"), most employees who join SERS on or after January 1, 2018 would no longer be covered by SERS' current DB only design, but rather would be covered by a hybrid DB/DC plan design including key features as described in the pages that follow.

This Consensus Hybrid proposal also calls for revisions to several of the current SERS DB provisions that would be applied on a prospective basis to virtually all current (pre-2017) SERS members. These changes are also described below.

Under the Consensus Hybrid proposal, on multiple different effective dates, various significant changes would occur to the current provisions of both of Pennsylvania's statewide retirement systems. This note addresses only the changes applicable to SERS.

**Exemption for Most Hazardous Duty Employees**

Under this Consensus Hybrid proposal, most hazardous duty employees (including Pennsylvania State Police, correction officers, enforcement officers and all other hazardous duty employees other than psychiatric security aides) would be exempt from certain provisions of the proposed new plan design. That is, (a) hazardous duty members hired after 2017 would be exempt from the Consensus Hybrid proposal provision that requires all post-2017 hires to join the new defined contribution (DC) plan and revised DB system; rather, they would continue to become members of the current SERS DB system only. On the other hand, (b) hazardous duty members who are active after July 1, 2016, regardless of their hire date, would be subject to the same Consensus Hybrid proposal legacy DB changes that will become applicable to virtually all active legacy DB system members.

References hereafter in this note to "all employees hired after the hybrid plan start date" being subject to the proposed new hybrid DB/DC plan provisions should be understood, if not specifically excepted, to exclude most hazardous duty employees.

**Summary**

The Consensus Hybrid proposal calls for a combination of changes to occur, primarily on three different effective dates, as follows:

- Effective July 1, 2016 and January 1, 2017, changes will occur to the future benefit rights of virtually all current (pre-2017) active SERS DB members. These changes (described fully in the pages that follow) will only affect benefits relating to future (post-effective date) service. Benefits relating to service prior to the effective date will continue as-is and not be impacted.
- A new SERS Defined Contribution (DC) plan and a revised version of the SERS Defined Benefit (DB) system will be implemented for those hired after December 31, 2017. As well, effective January 1, 2018, all active SERS members who are “elected officers” (regardless of their membership class) will not be allowed to continue membership in the current SERS DB system but instead, will be required to join the new DC plan and revised DB system upon election or re-election.

Descriptions of the key features of each of these changes proposed under the Consensus Hybrid proposal follow.

#### **Changes in Benefit Provisions Applicable to Legacy DB System Members**

Under the Consensus Hybrid proposal, changes would occur, some effective July 1, 2016 and some effective January 1, 2017, to the future benefit rights of virtually all active legacy DB (pre-2017) system members. These changes will not affect benefits relating to service prior to the effective date of each change. That is, “pre-change” accrued benefits will continue as-is.

Our brief descriptions of the two primary types of benefit provision changes follow.

#### **(1) Actuarially Neutral Option 4 Relating to Post-July 1, 2016 Member Contributions**

The Consensus Hybrid proposal calls for a change to become applicable to all legacy DB members who, as of June 30, 2016, remain eligible for the “actuarially favorable (to the member)” Option 4 withdrawal. Specifically, all member contributions made on or after July 1, 2016 and all statutory interest on those contributions, if withdrawn under Option 4, will be subject to an actuarially neutral Option 4 calculation (which is less favorable to the member than the calculation relating to the pre-July 1, 2016 contributions and statutory interest thereon).

#### **(2) Revised Final Average Salary for Post-2016 Service**

The Consensus Hybrid proposal calls for changes effective January 1, 2017 to the current (generally three-year) Final Average Salary calculation applicable to all legacy DB members other than state police who qualify for the “DiLauro Award” (who will continue to have their benefits based upon their highest year salary, inclusive of overtime). The new FAS will be the higher of (a) or (b) below, where:

(a) = Current 3-Year Final Average Salary, but excluding post-12/31/2016 overtime and

(b) = New 5-Year Final Average Salary, including post-12/31/2016 overtime



Two other changes in the post-July 1, 2016 benefit provisions applicable to legacy DB system members that are included in the Consensus Hybrid proposal are worthy of mention here:

- For Class A-3 and Class A-4 members, for whom a new Shared-Risk provision became applicable under Act 120 (subjecting them to a potential increase in their employee contribution rate by as much as 2.0% in the event of underperformance of SERS investments), the Consensus Hybrid proposal has introduced a new Shared-Gain provision. This Shared-Gain provision mirrors the Shared-Risk provision, in that it subjects these same classes of members to a potential decrease in their employee contribution rate by as much as 2%, in the event of over performance of SERS investments.
- For Class AA and Class D-4, the Consensus Hybrid proposal has also introduced new Shared-Risk and Shared-Gain provisions similar to those discussed above for Class A-3 and Class A-4 members. Under these provisions, the performance of SERS investments would be measured every three years. In the event of over performance during this period, the Shared-Gain provision could result in the employee contribution rate being reduced. The downward-adjusted rate would then be in effect for the following three years, after which new performance measurements would govern contribution rate levels.

Given that the assumption used in our Consensus Hybrid proposal cost analyses is that the SERS fund will consistently earn 7.5% annual investment returns in all years after December 31, 2014 (consistent with our current actuarial valuation assumptions), neither the Shared-Gain nor the Shared-Risk provisions have any cost implications of relevance for this Cost Note.

### **Transition to the Consensus Hybrid Design**

Most, but not all, non-hazardous duty employees who join SERS on or after January 1, 2018, would be covered by the proposed new hybrid DB/DC design, and therefore, upon hire, would become members of the hybrid DB system and participants of the hybrid DC plan. For “elected officers” (including: (1) newly elected or re-elected governor, lieutenant governor, treasurer, auditor general, attorney general, and legislators and (2) members of the judiciary who are elected to a new judicial position), the hybrid design would become applicable coincident with their assuming office, but not prior to January 1, 2018.

The Consensus Hybrid proposal would mandate that, with the exceptions as noted herein, all employees hired after the hybrid plan start date (January 1, 2018) become participants in a new SERS hybrid DC plan, which would be separate from the SERS DB system. It is anticipated that each hybrid DC participant would have established for him/her an individual investment account within a SERS hybrid DC trust fund, which would be separate from the SERS DB fund.

The Consensus Hybrid proposed legislation would create a new class of DB membership, Class A-5, applicable to all SERS employees who are hired after the hybrid plan start date. This class would be a new tier within the existent SERS DB system; the new structure would not be a

separate plan and would not have a separate fund. Under this proposal, SERS would not be closed to new members; SERS would remain open into the future to members who join the SERS DB system via the new hybrid membership class. Note: Current SERS members (hired prior to 2018) would not have an option to leave their existing classes of service and join the hybrid plan.

**Specifics of the Consensus Hybrid Proposed Design**

This summarizes our understanding of the key features of this proposed hybrid DB/DC design:

1. Formula for Single Life Annuity at Superannuation for New Hybrid DB members:  
1% X 5-Year Final Average Salary (including overtime) X Total Credited Service

No “buy-up” to a higher benefit accrual rate would be available, as under Act 120.

The Final Average Salary (FAS) would generally be calculated by averaging the five highest calendar years of compensation, including overtime pay as applicable.

Note: While State Police hired January 1, 2018 and after are generally exempt from the Consensus Hybrid DB/DC design, including the 5-Year FAS described above, they ARE subject to the same (greater of) FAS provision generally applicable to the post-2016 service of legacy DB members if they separate from service prior to becoming eligible for the DiLauro award. If they reach DiLauro eligibility, the current DiLauro award provisions would continue to apply. New State Police will need at least 20 years of State Police service to be eligible since non-State Police service will no longer count toward the DiLauro eligibility. Non-State Police service will provide a benefit in addition to the DiLauro award.

2. Contribution Rates under Consensus Hybrid Design: See table that follows for a summary of the Consensus Hybrid proposed contribution rates, expressed as a percentage of payroll.

Consensus Hybrid Defined Benefit (DB)/ Defined Contribution (DC) Design Mandatory Contribution Rates (As % of Payroll)	
<b>Defined Benefit (DB)</b>	
Employee	3.00%
Employer	Actuarially Determined
<b>Defined Contribution (DC)</b>	
Employee	3.25%
Employer	2.50%

3. Hybrid DB Superannuation (i.e., Normal Retirement Age): Eligibility and benefits would generally be consistent with the Act 120 provisions applicable to members of the same class and category.

4. Hybrid DB Early Retirement: Eligibility and benefits would generally be consistent with the Act 120 provisions applicable to members of the same class and category.
5. Hybrid DB Vesting: 10-year cliff. Refund of accumulated deductions (member contributions + 4% statutory interest) would be available, upon non-vested termination.
6. Hybrid DB Disability and Death Benefits: Eligibility and benefits would generally be consistent with the Act 120 provisions applicable to members of the same class and category.
7. Hybrid DB Shared-Risk/Gain Provision: If DB fund investment returns are low/high relative to actuarial assumptions, hybrid DB members could be subject to higher/lower employee contribution rates, with the potential maximum deviation from the usual mandatory contribution rate being + or - 2% of pay. Projections attached to this note are based on an assumption that the target investment returns (of 7.5% annually) are earned in all future years; therefore, for purposes of this cost note, this provision would not impact future SERS costs.
8. Hybrid DB Option 4: Upon retirement, hybrid DB members will be eligible for an actuarially cost neutral Option 4 full withdrawal of their accumulated deductions.
9. Hybrid DC Vesting: 3-year cliff for employer contributions and related earnings/losses; immediate vesting for employee contributions and related earnings/losses.
10. Hybrid DC Disability and Death Benefits: Vested account balances would generally be available.

#### **Changes to Current SERS Financing Provisions Under the Consensus Hybrid Proposal**

In accordance with our interpretation of the draft provisions of the Consensus Hybrid proposal:

- We have changed the actuarial funding method being utilized for the determination of the SERS normal cost rate from the current funding method (a variation of the Entry-Age Actuarial Cost Method) to the traditional Entry-Age Actuarial Cost Method. The significant difference between the method currently used for SERS and the method proposed under the Consensus Hybrid proposal is that the normal cost is currently based upon the benefits and contributions for the average new employee whereas, under the proposed method, the normal cost is based upon the benefits and contributions for all current covered employees from their date of entry.
- If the legislation resulting from this proposal causes there to be a change in the SERS unfunded accrued liability (UAL) (and it most certainly would), then under current law, that change in liability would be funded using a 10-year, level-dollar amortization. However, there is some uncertainty as to whether the change in UAL that would result

from this proposal would be amortized over 10 years as prescribed by current law or over a longer period, such as 20 to 30 years. For purposes of this cost note, in order to be more informative to those reviewing these results, we have performed our SERS cost calculations based upon each of three possible level-dollar amortization periods: 10 years, 20 years and 30 years.

- Under this Consensus Hybrid proposal, a change is proposed to the employer contribution collars that are scheduled under current law (as established under Act 2010-120). Specifically, this proposal calls for (i) the maximum employer contribution rate for the 2016/2017 fiscal year to be the sum of a contribution collar of 2.25% of payroll added to the final 2015/2016 fiscal year contribution requirement of 25.00% of payroll, to produce a result of 27.25% of payroll and (ii) the use of a 4.5% of payroll contribution collar for purposes of determining collared contribution rates in subsequent fiscal years (fiscal 2017/2018 and beyond). Note that the only difference between the two sets of collars is that the current law collar for the 2016/2017 fiscal year is 4.5% of payroll whereas the proposed collar for the 2016/2017 fiscal year is 2.25% of payroll.

#### **Estimated Initial Cost Impact of the Consensus Hybrid Proposal on the SERS DB System**

If the Consensus Hybrid proposal were to become law, effective in fiscal 2016/2017, the SERS employer normal cost rate would be based upon the new traditional Entry-Age Actuarial Cost Method (as described in the first bullet above). Under this new method the resulting normal cost rate is 9.72% of payroll, a considerably higher rate than the 4.95% of payroll normal cost rate in fiscal 2015/2016. This change results in significantly increased normal cost rates (versus the prior year rate of 4.95%) over our entire cost projection period, and we have determined that the present value of those future normal cost dollar increases is approximately \$3.5 billion. Therefore, in conjunction with our projected December 31, 2015 actuarial valuation, approximately \$3.5 billion of SERS liability, previously scheduled to be funded via UAL amortization payments, would instead be funded via future employer normal cost payments. The net effect of the higher normal cost funding pattern and the lower UAL amortization funding pattern over our cost projection period is a cost, since the increase in future normal cost payments is of greater magnitude than the decrease in future UAL amortization payments. It should be noted that this decrease in UAL would cause the SERS funded status to increase by more than 5 percent. These changes are reflected (though masked by the impact of other changes) in our Consensus Hybrid proposal funding projections attached to this note.

#### **Projection of Future Costs Under the Consensus Hybrid Proposal**

Starting with the census data, asset data and actuarial assumptions underlying our December 31, 2014 actuarial valuation (including an assumed investment return of 7.5 percent per year, compounded annually) and projecting our December 31, 2014 valuation results forward to December 31, 2015 and implementing the new traditional Entry-Age Actuarial Cost Method for the December 31, 2015 and all subsequent actuarial valuations and incorporating the new benefit provisions (effective either July 1, 2016 or January 1, 2017) to legacy DB members of



SERS as described above and incorporating the new Hybrid DB plan design outlined above for new hires on or after January 1, 2018 and incorporating the new Hybrid DC plan design outlined above for new entrants to SERS on or after January 1, 2018 and reflecting the two changes to the current SERS financing provisions as described in the second and third bullets above, Hay Group has projected the future employer contributions required to fund SERS and the new DC plan in accordance with the Consensus Hybrid proposal.

### **Schedules Attached to This Cost Note**

We have attached to this note the results of our funding projections and other relevant cost information, as follows:

- **Three Consensus Hybrid Projection Results:** These three one-page cost projections show our projected annual funding of SERS if the Consensus Side-by-Side Hybrid design proposal (including the benefit and contribution provisions described previously) were to be enacted, including the revision to the traditional Entry-Age Actuarial Cost Method, and the change in Unfunded Actuarial Liability (UAL) resulting from this proposal were amortized on a level dollar basis over
  - 10 years,
  - 20 years or
  - 30 years respectively,
 including the (savings)/cost relative to baseline funding. Note that these three tables present our projections of future SERS funding through fiscal year 2051/2052, all of which reflect the impact of the Consensus Hybrid proposal.
- **Baseline Projection:** This table presents, for purposes of comparison, the results of our December 31, 2014 actuarial valuation and our projection of future funding through fiscal year 2051/2052, assuming no changes to any of the current SERS benefit provisions or financing methodologies.

Also attached are the following:

- Three Summary Tables, which provide breakdowns of the long-term cumulative (savings)/cost by the key components of the proposal, including, in the last four steps, the estimated impact of each of the proposed financing changes being considered in this proposal, including:
  - A change to the traditional Entry-Age Actuarial Cost Method (or, a revised normal cost approach)
  - Continuing with the current law 10-year level dollar amortization of the decrease in UAL due to this proposed legislation or
  - Changing from the current law 10-year level dollar amortization of the decrease in UAL due to this proposed legislation to, possibly, a 20-year level dollar amortization or
  - Changing from the current law 10-year level dollar amortization of the decrease in UAL due to this proposed legislation to, possibly, a 30-year level dollar amortization) and
  - A possible change in contribution collars,

- One last one-page attachment that we have included herein to provide further information for those reviewing the details of these cost analyses: A schedule of Net Present Values of the net Cost/(Savings) that would result if the Consensus Hybrid proposal became law.

### **Our Cost Results in Brief**

As shown in our attached cost projections for this proposed Consensus Hybrid design, if this proposal were to become law, we estimate that it would result in a cumulative cost/savings relative to our current plan baseline projected costs through the end of FY 2052 as follows:

- Cumulative cost of \$1,171.0 million (or \$1.1710 billion), if the decrease in UAL were amortized over 10 years,
- Cumulative savings of \$740.3 million (or \$0.7403 billion), if the decrease in UAL were amortized over 20 years and
- Cumulative savings of \$2,099.7 million (or \$2.0997 billion), if the decrease in UAL were amortized over 30 years.

It should be noted that the proposed financing change to reduce employer contribution collars had the following cost/savings impact:

- Based upon a 10-year UAL amortization, the reduced collars had no impact. That is, the fiscal 2016/2017 projected employer contribution rate (26.79%) was lower than the 27.25% of payroll collared contribution level, thereby ending the applicability of contribution collars to subsequent years.
- Based upon a 20-year UAL amortization, the reduced collars increased costs by about \$208 million. This was due to the fact that the fiscal 2016/2017 projected employer contribution rate was higher than the 27.25% of payroll collared contribution level; however, the fiscal 2017/2018 projected employer contribution rate was lower than the 31.75% of payroll collared contribution level, thereby ending the applicability of contribution collars to subsequent years.
- Based upon a 30-year UAL amortization, the reduced collars increased costs by about \$176 million. This was due to the fact that the fiscal 2016/2017 projected employer contribution rate was higher than the 27.25% of payroll collared contribution level; however, the fiscal 2017/2018 projected employer contribution rate was lower than the 31.75% of payroll collared contribution level, thereby ending the applicability of contribution collars to subsequent years

### **Important Notes**

Please note the following regarding our handling of the attached funding projections:

1. In performing our cost analyses and preparing this cost note and the attachments hereto, Hay Group has applied the proposed changes to current law as presented to us. We have not reviewed or opined on the legality of any aspect of this proposal.
2. Hay Group's past convention of showing results for employer cost projections such as these as percentages of payroll to two decimal places may be somewhat misleading. This level of precision is not really possible for estimates of this nature.
3. All of these projections are based upon the expectation that (i) for all years after 2014, the actual economic and demographic experience of SERS will be consistent with the underlying actuarial valuation assumptions and (ii) all employer contribution amounts shown in the "Expected FY Contribution" columns will, in fact, be contributed.
4. The attached projection schedules include a particularly important column of information that may warrant further explanation: "Cumulative (Savings) / Cost Relative to Baseline" shows the projected cumulative cost or savings in employer contributions (in millions of dollars) that would result under the Consensus Hybrid proposal versus under the current law (Baseline).
5. The cost estimates included herein were based upon our December 31, 2014 actuarial valuation results, including the underlying census data, assets and actuarial assumptions.

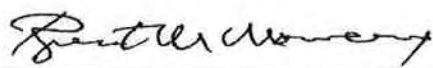
#### **Actuarial Certification**


To the best of our knowledge, the information we are presenting herein is complete and accurate and all costs and liabilities have been determined in conformance with generally accepted actuarial principles and on the basis of actuarial assumptions and methods which are reasonable (taking into account the past experience of SERS and reasonable expectations) and which represent our best estimate of anticipated experience under the plan.

The actuaries certifying to this valuation are members of the Society of Actuaries or other professional actuarial organizations, and meet the General Qualification Standards of the American Academy of Actuaries for purposes of issuing Statements of Actuarial Opinion.

Please let us know if you have any questions on any of this.

Respectfully submitted,  
Hay Group, Inc.

By:   
Brent M. Mowery, F.S.A.  
Member American Academy of Actuaries  
Enrolled Actuary No. 14-3885

By:   
Craig R. Graby  
Member American Academy of Actuaries  
Enrolled Actuary No. 14-7319

December 3, 2015

SERS Projected Year Contributions  
(Based Upon Final December 31, 2014 Valuation)

Consensus Side By Side Hybrid DB/DC Design 12/01/2015 = Legacy DB Plan With New Provisions, Including New 1.00% Accrual Defined Benefit Tier, Plus New DC Plan (DCDB) With Er. Contrib @ 2.5%; State Police, Correction Officers, and Other Hazardous Duty ONLY Remain in Current DB Plan; No Fresh Start; No Legacy Contribution/Accrual Rate Changes; Traditional Entry Age Normal Cost; Revised Contribution Collars; Cost of Legislation Amortized Over 30 Years

Year	Investment Return	Fiscal Year	Floor Contribution	Projected DB Contribution	Expected DB Plan FY		Expected DC/DB Plan FY Payroll	Expected DC/DB Contribution (\$ in millions)	Total DB+DC/DB Contribution (\$ in millions)	DB+DC/DB Contribution as a % of Pay	Annual (Savings) / Cost Relative to Baseline	Cumulative (Savings) / Cost Relative to Baseline	Funded Ratio (A%)	UAL (\$ in billions)	Funded Ratio (MV%)	Baseline Percent	Baseline \$ (\$ in millions)
					Plan FY Payroll	DB Contribution (\$ in millions)											
2011	2.70%	2012/2013	5.10%	11.50	5,890.7	677.4	-	677.4	11.50	11.50	-	-	65.3	14.69	57.6	11.50	677.4
2012	12.00%	2013/2014	5.01%	16.00	5,836.4	933.8	-	933.8	16.00	16.00	-	-	58.7	17.78	58.9	16.00	933.8
2013	13.60%	2014/2015	5.00%	20.50	5,897.6	1,209.0	-	1,209.0	20.50	20.50	-	-	59.2	18.17	62.4	20.50	1,209.0
2014	6.40%	2015/2016	4.95%	25.00	6,021.7	1,505.4	-	1,505.4	25.00	25.00	-	-	59.4	17.10	61.1	25.00	1,505.4
2015	7.50%	2016/2017	9.72%	27.25	6,205.3	1,690.9	-	1,690.9	27.25	27.25	(139.7)	(139.7)	65.4	14.43	67.1	29.50	1,830.6
2016	7.50%	2017/2018	9.57%	29.74	6,277.3	1,890.6	117.3	1,904.8	29.79	29.79	(39.7)	(179.4)	67.1	14.06	67.7	30.41	1,944.5
2017	7.50%	2018/2019	9.34%	28.66	6,233.5	1,855.1	356.1	1,897.3	28.79	28.79	(39.8)	(219.3)	68.7	13.62	68.7	29.40	1,937.1
2018	7.50%	2019/2020	9.11%	27.93	6,173.5	1,840.2	617.1	1,911.9	28.15	28.15	(45.1)	(264.4)	69.8	13.42	69.9	28.82	1,957.0
2019	7.50%	2020/2021	8.90%	27.13	6,130.2	1,821.2	867.5	1,920.1	27.44	27.44	(49.9)	(314.3)	70.9	13.13	71.0	28.15	1,970.0
2020	7.50%	2021/2022	8.70%	26.37	6,088.0	1,803.9	1,123.2	1,929.7	26.76	26.76	(54.7)	(369.0)	72.1	12.82	72.1	27.52	1,984.4
2021	7.50%	2022/2023	8.51%	25.65	6,046.0	1,788.1	1,385.1	1,940.6	26.11	26.11	(59.6)	(428.6)	73.1	12.50	73.1	26.92	2,000.2
2022	7.50%	2023/2024	8.32%	24.95	6,001.4	1,772.9	1,656.4	1,952.1	25.49	25.49	(64.8)	(493.4)	74.2	12.17	74.2	26.34	2,016.9
2023	7.50%	2024/2025	8.13%	24.27	5,953.3	1,757.8	1,938.0	1,963.9	24.89	24.89	(70.1)	(563.5)	75.2	11.80	75.2	25.78	2,034.0
2024	7.50%	2025/2026	7.95%	23.61	5,902.1	1,742.9	2,229.9	1,976.0	24.30	24.30	(75.7)	(639.3)	76.3	11.41	76.3	25.23	2,051.7
2025	7.50%	2026/2027	7.78%	22.97	5,848.6	1,728.3	2,531.4	1,988.4	23.73	23.73	(81.6)	(720.8)	77.3	11.00	77.3	24.70	2,070.0
2026	7.50%	2027/2028	7.61%	22.35	5,794.6	1,714.3	2,841.0	2,001.4	23.18	23.18	(87.6)	(808.4)	78.4	10.55	78.4	24.19	2,089.0
2027	7.50%	2028/2029	7.44%	21.75	5,741.4	1,700.8	3,157.6	2,014.8	22.64	22.64	(93.7)	(902.1)	79.5	10.07	79.5	23.69	2,108.5
2028	7.50%	2029/2030	7.29%	21.17	5,687.3	1,687.8	3,483.1	2,028.6	22.12	22.12	(100.0)	(1,002.1)	80.6	9.55	80.6	23.21	2,128.6
2029	7.50%	2030/2031	7.13%	20.61	5,631.7	1,675.1	3,818.4	2,042.9	21.62	21.62	(106.4)	(1,108.5)	81.8	8.99	81.8	22.74	2,149.3
2030	7.50%	2031/2032	6.98%	20.06	5,574.5	1,662.8	4,163.9	2,057.7	21.13	21.13	(113.0)	(1,221.5)	83.1	8.39	83.1	22.29	2,170.7
2031	7.50%	2032/2033	6.84%	19.53	5,514.5	1,650.6	4,520.9	2,072.8	20.65	20.65	(120.0)	(1,341.5)	84.4	7.75	84.4	21.85	2,192.8
2032	7.50%	2033/2034	6.70%	19.01	5,453.9	1,638.8	4,887.6	2,088.4	20.19	20.19	(127.2)	(1,468.7)	85.7	7.05	85.7	21.42	2,215.6
2033	7.50%	2034/2035	6.57%	18.52	5,395.8	1,627.8	5,261.1	2,104.8	19.75	19.75	(134.2)	(1,603.0)	87.2	6.31	87.2	21.01	2,239.0
2034	7.50%	2035/2036	6.44%	18.04	5,340.5	1,617.4	5,641.4	2,121.7	19.32	19.32	(141.5)	(1,744.5)	88.8	5.51	88.8	20.61	2,263.2
2035	7.50%	2036/2037	6.32%	17.57	5,287.0	1,607.5	6,029.9	2,139.2	18.90	18.90	(149.0)	(1,893.4)	90.5	4.65	90.5	20.22	2,288.2
2036	7.50%	2037/2038	6.20%	17.12	5,233.4	1,598.1	6,428.6	2,157.5	18.50	18.50	(156.5)	(2,049.9)	92.3	3.72	92.3	19.84	2,314.0
2037	7.50%	2038/2039	6.09%	16.69	5,179.3	1,588.9	6,838.4	2,176.3	18.11	18.11	(164.2)	(2,214.1)	94.4	2.73	94.4	19.48	2,340.5
2038	7.50%	2039/2040	5.98%	16.26	5,126.3	1,580.1	7,258.0	2,195.7	17.73	17.73	(172.2)	(2,386.3)	96.5	1.66	96.5	19.12	2,367.9
2039	7.50%	2040/2041	5.88%	12.14	5,075.4	1,571.5	7,686.6	2,217.7	17.33	17.33	(180.2)	(2,566.6)	98.9	0.51	98.9	15.06	1,921.8
2040	7.50%	2041/2042	5.78%	9.16	5,027.9	1,564.6	8,123.3	2,239.2	16.94	16.94	(188.3)	(2,754.9)	100.5	(0.25)	100.5	12.13	1,595.7
2041	7.50%	2042/2043	5.69%	5.83	4,984.3	1,558.1	8,568.0	2,262.7	16.54	16.54	(196.5)	(2,951.4)	101.5	(0.71)	101.5	8.86	1,200.8
2042	7.50%	2043/2044	5.60%	5.60	4,945.7	1,552.1	9,020.0	2,286.1	16.14	16.14	(204.8)	(3,148.2)	101.7	(0.78)	101.7	6.85	957.1
2043	7.50%	2044/2045	5.52%	5.52	4,913.7	1,546.1	9,477.9	2,311.6	15.74	15.74	(213.0)	(3,341.2)	101.3	(0.59)	101.3	6.67	959.9
2044	7.50%	2045/2046	5.45%	5.45	4,889.4	1,540.1	9,941.2	2,337.1	15.34	15.34	(221.2)	(3,532.4)	101.4	(0.62)	101.4	6.42	952.1
2045	7.50%	2046/2047	5.38%	5.38	4,874.9	1,534.1	10,408.0	2,362.6	14.94	14.94	(229.4)	(3,721.8)	101.4	(0.64)	101.4	6.18	944.6
2046	7.50%	2047/2048	5.32%	5.32	4,871.5	1,528.1	10,877.5	2,387.1	14.54	14.54	(237.6)	(3,909.4)	101.9	(0.69)	101.9	6.30	992.4
2047	7.50%	2048/2049	5.27%	5.27	4,881.5	1,522.1	11,349.9	2,411.6	14.14	14.14	(245.8)	(4,100.2)	102.1	(0.89)	102.1	6.44	1,045.5
2048	7.50%	2049/2050	5.22%	5.22	4,907.6	1,516.1	11,816.8	2,433.1	13.74	13.74	(254.0)	(4,292.2)	102.3	(0.96)	102.3	6.42	1,072.9
2049	7.50%	2050/2051	5.18%	5.18	4,950.0	1,510.1	12,284.5	2,454.6	13.34	13.34	(262.2)	(4,484.4)	102.5	(1.03)	102.5	6.43	1,108.6
2050	7.50%	2051/2052	5.15%	5.15	5,006.8	1,504.1	12,753.3	2,476.1	12.94	12.94	(270.4)	(4,676.6)	102.8	(1.10)	102.8	6.44	1,144.4



**Summary Table - Using 30-Year Amortization Financing**

**Pennsylvania State Employees' Retirement System  
Allocation of Potential Projected (Savings)/Cost Through FY 2052  
Due to Consensus Side-By-Side Hybrid Design 12/01/2015, Including Changes to Current DB  
(Amounts in millions)**

**Benefit Changes**

Amendment - 1.00% DB Accrual (Ee 3.00%) for most hires after December 31, 2017	\$ (2,672.3)
Amendment - DC Plan (Ee 3.25%; Er 2.5%) for most hires after December 31, 2017	\$ 4,986.4
Amendment - Prospective Cost Neutral Option 4 for Pre-Act 120 Members	\$ (358.4)
Amendment - Greater of FAS 3 with No OT and FAS 5 on Future DB Accruals for Current DB Members Other Than State Police with 20 or more years of service; FAS 5 for Hybrid DB Members	\$ (1,301.4)
Sub-total Benefit Changes	\$ 654.3

**Total Hybrid Plan and Current DB Changes: (Savings)/Cost through FY 2052 without Financing Changes**

\$ 654.3

**Financing Changes**

New Entry Age Normal Cost Approach	\$ 516.7
Revised Amortization Period for Plan Changes From 10 to 30 Years	\$ (3,446.4)
Revised Contribution Collars	\$ 175.7
Sub-total Financing Changes	\$ (2,754.0)

**Total Hybrid Plan and Current DB Changes: (Savings)/Cost through FY 2052 with Both Benefit and Financing Changes**

\$ (2,099.7)

Notes:

The potential (savings)/cost was valued in the following order:

1.00% accrual DB design generally effective after December 31, 2017

- State Police and most other hazardous duty employees exempt from both new DB and DC plans
- DB employee contribution rate: 3.00%
- Elected Officials: Includes change to lower accrual upon election/reelection
- Does not include impact of changes to FAS 5 in Hybrid DB until later FAS step

DC Plan (Ee 3.25%; Er 2.5%) generally effective after December 31, 2017

- State Police and most other hazardous duty employees exempt from both new DB and DC plans

Current Member DB changes:

- Prospective Cost Neutral Option 4 effective after June 30, 2016
- Prospective Greater of FAS 3 No OT and FAS 5 for all except State Police with 20 or more years of service effective after December 31, 2016

Entry Age Normal Cost Method Changes

Revised Amortization Period for Decrease in UAL due to Legislated Plan Changes

- From 10 Years to 30 Years

Revised Employer Contribution Collars

If a different order is used, the cost impact will vary from what is shown above.

SERS Projected Employer Contributions Upon Final December 31, 2014 Valuation Under Senate Bill 108z; Printer's Number 1460

Consensus Side By Side Hybrid DB/DC Design 12/01/2015 = Legacy DB Plan With New Provisions, Including New 1.00% Accrual Defined Benefit Tier, Plus New DC Plan (DC/DB) With Er Contrib @ 2.5%, State Police, Correction Officers, and Other Hazardous Duty ONLY Remain in Current DB Plan; No Fresh Start; No Legacy Contributions/Accrual Rate Changes; Traditional Entry Age Normal Cost; Cost of Legislation Amortized Over 30 Years; Reduced Collar (FY2016-17: 2.25%)

Year	Investment Return	Fiscal Year	Floor Contribution	Projected DB Percent Contribution	Total										Funded Ratio (MV%)	UAL (\$ in billions)	Funded Ratio (A%)	Annual (Savings) / Cost Relative to Baseline	Cumulative (Savings) / Cost Relative to Baseline	Baseline Percent	Baseline \$ (\$ in millions)
					Expected Plan FY Payroll	Expected DB Contribution (\$ in millions)	Expected DC/DB Plan FY Payroll	Expected DC/DB Contribution (\$ in millions)	DB+DC/DB Contribution as a % of DB+DC/DB Pay	Annual (Savings) / Cost Relative to Baseline	Cumulative (Savings) / Cost Relative to Baseline	DB+DC/DB Contribution (\$ in millions)	DB+DC/DB Contribution as a % of DB+DC/DB Pay	DB+DC/DB Contribution (\$ in millions)							
2011	2.70%	2012/2013	5.10%	11.50	5,890.7	677.4	-	-	11.50	-	-	65.3	14.69	57.6	11.50	677.4					
2012	12.00%	2013/2014	5.01%	16.00	5,836.4	933.8	-	-	16.00	-	-	58.7	17.78	58.9	16.00	933.8					
2013	13.60%	2014/2015	5.00%	20.50	5,897.6	1,209.0	-	-	20.50	-	-	59.2	17.90	62.4	20.50	1,209.0					
2014	6.40%	2015/2016	4.95%	25.00	6,021.7	1,505.4	-	-	25.00	-	-	59.4	18.17	61.1	25.00	1,505.4					
2015	7.50%	2016/2017	9.72%	27.25	6,205.3	1,690.9	-	-	27.25	-	-	65.4	14.43	67.1	29.50	1,830.6					
2016	7.50%	2017/2018	9.57%	29.74	6,277.3	1,890.6	117.3	14.2	29.79	1,904.8	(39.7)	67.1	14.06	67.7	30.41	1,944.5					
2017	7.50%	2018/2019	9.34%	28.66	6,233.5	1,855.1	356.1	42.2	28.79	1,897.3	(39.8)	68.7	13.62	68.7	29.40	1,937.1					
2018	7.50%	2019/2020	9.11%	27.93	6,173.5	1,840.2	71.7	11.7	28.15	1,911.9	(45.1)	69.9	13.42	69.9	28.82	1,957.0					
2019	7.50%	2020/2021	8.90%	27.13	6,130.2	1,821.2	867.5	98.9	27.44	1,920.1	(49.9)	71.0	13.13	71.0	28.15	1,970.0					
2020	7.50%	2021/2022	8.70%	26.37	6,088.0	1,803.9	1,123.2	125.8	26.76	1,929.7	(54.7)	72.2	12.82	72.2	27.52	1,984.4					
2021	7.50%	2022/2023	8.51%	25.65	6,046.0	1,788.1	1,385.1	152.5	26.11	1,940.6	(59.6)	73.3	12.50	73.3	26.92	2,000.2					
2022	7.50%	2023/2024	8.32%	24.95	6,001.4	1,772.9	1,656.4	179.2	25.49	1,952.1	(64.8)	74.4	12.17	74.4	26.34	2,016.9					
2023	7.50%	2024/2025	8.13%	24.27	5,953.3	1,757.8	1,938.0	206.1	24.89	1,963.9	(70.1)	75.5	11.80	75.5	25.78	2,034.0					
2024	7.50%	2025/2026	7.95%	23.61	5,902.1	1,742.9	2,229.9	233.1	24.30	1,976.0	(75.7)	76.6	11.41	76.6	25.23	2,051.7					
2025	7.50%	2026/2027	7.78%	22.97	5,848.6	1,728.3	2,531.4	260.1	23.73	1,988.4	(81.6)	77.8	11.00	77.8	24.70	2,070.0					
2026	7.50%	2027/2028	7.61%	22.35	5,794.6	1,714.3	2,841.0	287.1	23.18	2,001.4	(87.6)	78.9	10.57	78.9	24.19	2,089.0					
2027	7.50%	2028/2029	7.44%	21.75	5,741.4	1,700.8	3,157.6	314.0	22.64	2,014.8	(93.7)	80.1	10.07	80.1	23.69	2,108.5					
2028	7.50%	2029/2030	7.29%	21.17	5,687.3	1,687.8	3,483.1	340.8	22.12	2,028.6	(100.2)	81.3	9.55	81.3	23.21	2,128.6					
2029	7.50%	2030/2031	7.13%	20.61	5,631.7	1,675.1	3,818.4	367.8	21.62	2,042.9	(106.4)	82.6	8.99	82.6	22.74	2,149.3					
2030	7.50%	2031/2032	6.98%	20.06	5,574.5	1,662.8	4,163.9	394.9	21.13	2,057.7	(113.0)	83.9	8.39	83.9	22.29	2,170.7					
2031	7.50%	2032/2033	6.84%	19.53	5,514.5	1,650.6	4,520.9	422.2	20.65	2,072.8	(120.0)	85.3	7.75	85.3	21.85	2,192.8					
2032	7.50%	2033/2034	6.70%	19.01	5,453.9	1,638.8	4,887.6	449.6	20.19	2,088.4	(127.2)	86.8	7.05	86.8	21.42	2,215.6					
2033	7.50%	2034/2035	6.57%	18.52	5,395.8	1,627.8	5,261.1	477.0	19.75	2,104.8	(134.2)	88.3	6.31	88.3	21.01	2,239.0					
2034	7.50%	2035/2036	6.44%	18.04	5,340.5	1,617.4	5,641.4	504.3	19.32	2,121.7	(141.5)	89.8	5.51	89.8	20.61	2,263.2					
2035	7.50%	2036/2037	6.32%	17.57	5,287.0	1,607.5	6,029.9	531.7	18.90	2,139.2	(149.0)	91.5	4.65	91.5	20.22	2,288.2					
2036	7.50%	2037/2038	6.20%	17.12	5,233.4	1,598.1	6,428.6	559.4	18.50	2,157.5	(156.5)	93.3	3.72	93.3	19.84	2,314.0					
2037	7.50%	2038/2039	6.09%	16.69	5,179.3	1,588.9	6,838.4	587.4	18.11	2,176.3	(164.2)	95.1	2.73	95.1	19.48	2,340.5					
2038	7.50%	2039/2040	5.98%	16.26	5,126.3	1,580.1	7,258.0	615.6	17.73	2,195.7	(172.2)	97.1	1.66	97.1	19.12	2,367.9					
2039	7.50%	2040/2041	5.88%	12.14	5,075.4	1,597.5	7,686.6	644.1	13.65	1,741.6	(180.2)	98.1	0.51	98.1	15.06	1,921.8					
2040	7.50%	2041/2042	5.78%	9.16	5,027.9	734.6	8,123.3	672.8	10.70	1,407.4	(188.3)	100.4	(0.25)	100.4	12.13	1,595.7					
2041	7.50%	2042/2043	5.69%	5.83	4,984.3	302.6	8,568.0	701.7	7.41	1,004.3	(196.5)	101.2	(0.71)	101.2	8.86	1,200.8					
2042	7.50%	2043/2044	5.60%	5.60	4,945.7	277.1	9,020.0	731.0	7.22	1,008.1	51.0	101.3	(0.78)	101.3	6.85	957.1					
2043	7.50%	2044/2045	5.52%	5.52	4,913.7	271.4	9,477.9	760.5	7.17	1,031.9	72.0	101.0	(0.59)	101.0	6.67	959.9					
2044	7.50%	2045/2046	5.45%	5.45	4,889.4	266.4	9,941.2	790.3	7.12	1,056.7	104.6	101.0	(0.62)	101.0	6.42	952.2					
2045	7.50%	2046/2047	5.38%	5.38	4,874.9	262.3	10,408.0	820.3	7.08	1,082.6	138.0	101.0	(0.64)	101.0	6.18	944.6					
2046	7.50%	2047/2048	5.32%	5.32	4,871.5	259.2	10,877.5	850.7	7.05	1,109.9	117.5	101.3	(0.83)	101.3	6.30	982.4					
2047	7.50%	2048/2049	5.27%	5.27	4,881.5	257.1	11,347.9	881.4	7.01	1,138.5	93.0	101.4	(0.89)	101.4	6.44	1,045.5					
2048	7.50%	2049/2050	5.22%	5.22	4,907.6	256.2	11,816.8	912.3	6.99	1,168.5	95.6	101.4	(0.96)	101.4	6.42	1,072.9					
2049	7.50%	2050/2051	5.19%	5.18	4,950.0	256.5	12,284.5	943.6	6.96	1,200.1	91.5	101.5	(1.03)	101.5	6.43	1,108.6					
2050	7.50%	2051/2052	5.15%	5.15	5,006.8	257.7	12,753.3	975.3	6.94	1,233.0	88.6	101.6	(1.10)	101.6	6.44	1,144.4					

**Summary Table - SB 1082, PN 1460**  
**Using 30-Year Amortization Financing & Reduced Collar (FY2016-17: 2.25%)**  
**Pennsylvania State Employees' Retirement System**  
**Allocation of Potential Projected (Savings)/Cost Through FY 2052**  
**Due to Side-By-Side Hybrid Design, Including Changes to Current DB**  
**(Amounts in millions)**

**Benefit Changes**

Amendment - 1.00% DB Accrual (Ee 3.00%) for most hires after December 31, 2017	\$ (2,672.3)
Amendment - DC Plan (Ee 3.25%; Er 2.5%) for most hires after December 31, 2017	\$ 4,986.4
Amendment - Prospective Cost Neutral Option 4 for Pre-Act 120 Members	\$ (358.4)
Amendment - Greater of FAS 3 with No OT and FAS 5 on Future DB Accruals for Current DB Members Other Than State Police with 20 or more years of service; FAS 5 for Hybrid DB Members	<u>\$ (1,301.4)</u>
Sub-total Benefit Changes	\$ 654.3
<b>Total Hybrid Plan and Current DB Changes: (Savings)/Cost through FY 2052 without Financing Changes</b>	<b>\$ 654.3</b>

**Financing Changes**

New Entry Age Normal Cost Approach	\$ 516.7
Revised Amortization Period for Plan Changes = From 10 to 30 Years	\$ (3,446.4)
Reduced Contribution Collar (FY2016-17: 2.25%)	<u>\$ 175.7</u>
Sub-total Financing Changes	\$ (2,754.0)
<b>Total Hybrid Plan and Current DB Changes: (Savings)/Cost through FY 2052 with Both Benefit and Financing Changes</b>	<b>\$ (2,099.7)</b>

Notes:

The potential (savings)/cost was valued in the following order:

- 1.00% accrual DB design generally effective after December 31, 2017
  - State Police and most other hazardous duty employees exempt from both new DB and DC plans
  - DB employee contribution rate: 3.00%
  - Elected Officials: Includes change to lower accrual upon election/reelection; however, current Elected Officials would have one-time opportunity to opt in to their current membership class upon post-2017 reelection
  - Does not include impact of changes to FAS 5 in Hybrid DB until later FAS step
- DC Plan (Ee 3.25%; Er 2.5%) generally effective after December 31, 2017
  - State Police and most other hazardous duty employees exempt from both new DB and DC plans
- Current Member DB changes:
  - Prospective Cost Neutral Option 4 effective after June 30, 2016
  - Prospective Greater of FAS 3 No OT and FAS 5 for all except State Police with 20 or more years of service effective after December 31, 2016
- Entry Age Normal Cost Method Changes
- Revised Amortization Period for Decrease in UAL due to Legislated Plan Changes
  - From 10 to 30 Years
- Reduced Employer Contribution Collar (FY2016-17: 2.25%)

If a different order is used, the cost impact will vary from what is shown above.

SERS Projected Employer Contributions ( ) Upon Final December 31, 2014 Valuation) Under:  
 Either SB 1082, PN 1460, A04826 Or SB 1082, PN 1460, A05049

Legacy DB Plan With New Provisions, Including New 1.00% Accrual Defined Benefit Tier, Plus New DC Plan (DC/DB) With Er Contrib @ 2.5%; State Police, Correction Officers, and Other Hazardous Duty ONLY Remain in Current DB Plan; No Fresh Start; No Legacy Contribution/Accrual Rate Changes; Traditional Entry Age Normal Cost; Cost of Legislation Amortized Over 30 Years; No Change to Act 120 Collars

Year	Investment Return	Fiscal Year	Floor Contribution	Projected DB Contribution (\$ in millions)	Expected DB Plan FY Payroll (\$ in millions)	Expected DB Contribution (\$ in millions)	DC/DB Plan Contribution (\$ in millions)	DC/DB Contribution (\$ in millions)	DB+DC/DB Contribution (\$ in millions)	DB+DC/DB Contribution as a % of DB+DC/DB Pay	Annual (Savings) / Cost Relative to Baseline	Cumulative (Savings) / Cost Relative to Baseline	Funded Ratio (AV%)	UAL (\$ in billions)	Funded Ratio (MV%)	Baseline Percent	Baseline \$ (\$ in millions)
2011	2.70%	2012/2013	5.10%	11.50	5,890.7	677.4	-	677.4	11.50	16.00	-	-	65.3	14.69	57.6	11.50	677.4
2012	12.00%	2013/2014	5.01%	16.00	5,836.4	933.8	-	933.8	16.00	16.00	-	-	58.7	17.78	58.9	16.00	933.8
2013	13.60%	2014/2015	5.00%	20.50	5,897.6	1,209.0	-	1,209.0	20.50	20.50	-	-	59.2	17.90	62.4	20.50	1,209.0
2014	6.40%	2015/2016	4.95%	25.00	6,021.7	1,505.4	-	1,505.4	25.00	25.00	-	-	59.4	18.17	61.1	25.00	1,505.4
2015	7.50%	2016/2017	9.72%	29.50	6,205.3	1,830.6	-	1,830.6	29.50	29.50	-	-	65.4	14.43	67.1	29.50	1,830.6
2016	7.50%	2017/2018	9.57%	29.65	6,277.3	1,884.5	117.3	1,897.7	29.65	29.65	(45.8)	(45.8)	67.2	13.98	67.9	30.41	1,944.5
2017	7.50%	2018/2019	9.34%	28.47	6,233.5	1,842.7	356.1	1,884.9	28.47	28.60	(52.2)	(98.1)	69.1	13.47	69.0	28.40	1,937.1
2018	7.50%	2019/2020	9.11%	27.75	6,173.5	1,827.8	617.1	1,899.5	27.75	27.97	(57.5)	(155.6)	70.1	13.28	70.2	28.82	1,957.0
2019	7.50%	2020/2021	8.90%	26.95	6,130.2	1,808.8	867.5	1,907.7	27.26	27.26	(62.3)	(217.9)	71.3	12.98	71.3	28.15	1,970.0
2020	7.50%	2021/2022	8.70%	26.20	6,088.0	1,791.5	1,123.2	1,917.3	26.59	26.59	(67.1)	(285.0)	72.5	12.68	72.5	27.52	1,984.4
2021	7.50%	2022/2023	8.51%	25.48	6,046.0	1,775.7	1,385.1	1,928.2	25.95	25.95	(72.0)	(357.0)	73.6	12.36	73.6	26.92	2,000.2
2022	7.50%	2023/2024	8.32%	24.79	6,001.4	1,760.5	1,782.2	1,939.7	25.33	25.33	(77.2)	(434.2)	74.7	12.03	74.7	26.34	2,016.9
2023	7.50%	2024/2025	8.13%	24.12	5,953.3	1,745.4	2,061.1	1,951.5	24.73	24.73	(82.5)	(516.7)	75.8	11.67	75.8	25.78	2,034.0
2024	7.50%	2025/2026	7.95%	23.46	5,902.1	1,730.5	2,229.9	1,963.6	24.15	24.15	(88.1)	(604.9)	76.9	11.28	76.9	25.23	2,051.7
2025	7.50%	2026/2027	7.78%	22.83	5,848.6	1,715.9	2,531.4	1,976.0	23.58	23.58	(94.0)	(698.8)	78.0	10.87	78.0	24.70	2,070.0
2026	7.50%	2027/2028	7.61%	22.21	5,794.6	1,701.9	2,841.0	1,989.0	23.03	23.03	(100.0)	(798.8)	79.2	10.42	79.2	24.19	2,089.0
2027	7.50%	2028/2029	7.44%	21.61	5,741.4	1,688.5	3,157.6	2,002.5	22.50	22.50	(106.0)	(904.8)	80.4	9.94	80.4	23.69	2,108.5
2028	7.50%	2029/2030	7.29%	21.04	5,687.3	1,675.5	3,483.1	2,016.3	21.98	21.98	(112.3)	(1,017.1)	81.6	9.43	81.6	23.21	2,128.6
2029	7.50%	2030/2031	7.13%	20.48	5,631.7	1,662.8	3,818.4	2,030.6	21.49	21.49	(118.7)	(1,135.8)	82.9	8.87	82.9	22.74	2,149.3
2030	7.50%	2031/2032	6.98%	19.93	5,574.5	1,650.4	4,163.9	2,045.3	21.00	21.00	(125.4)	(1,261.2)	84.2	8.28	84.2	22.28	2,170.7
2031	7.50%	2032/2033	6.84%	19.41	5,514.5	1,638.2	4,520.9	2,060.4	20.53	20.53	(132.4)	(1,393.6)	85.5	7.64	85.5	21.85	2,192.8
2032	7.50%	2033/2034	6.70%	18.89	5,453.9	1,626.5	4,887.6	2,076.1	20.08	20.08	(139.5)	(1,533.1)	87.0	6.95	87.0	21.42	2,215.6
2033	7.50%	2034/2035	6.57%	18.40	5,395.8	1,615.4	5,261.1	2,092.4	19.63	19.63	(146.6)	(1,679.8)	88.5	6.21	88.5	21.01	2,239.0
2034	7.50%	2035/2036	6.44%	17.92	5,340.5	1,605.0	5,641.4	2,109.3	19.21	19.21	(153.9)	(1,833.7)	90.0	5.41	90.0	20.61	2,263.2
2035	7.50%	2036/2037	6.32%	17.46	5,287.0	1,595.2	6,029.9	2,126.9	18.79	18.79	(161.3)	(1,994.9)	91.7	4.56	91.7	20.22	2,288.2
2036	7.50%	2037/2038	6.20%	17.02	5,233.4	1,585.7	6,428.6	2,145.1	18.39	18.39	(168.9)	(2,163.8)	93.4	3.64	93.4	19.84	2,314.0
2037	7.50%	2038/2039	6.09%	16.58	5,179.3	1,576.5	6,838.4	2,163.9	18.01	18.01	(176.6)	(2,340.4)	95.3	2.65	95.3	19.48	2,340.5
2038	7.50%	2039/2040	5.98%	16.17	5,126.3	1,567.8	7,258.0	2,183.4	17.63	17.63	(184.5)	(2,524.9)	97.2	1.59	97.2	19.12	2,367.9
2039	7.50%	2040/2041	5.88%	12.04	5,075.4	1,085.2	7,686.6	2,199.3	13.55	13.55	(192.5)	(2,717.5)	99.2	0.44	99.2	15.06	1,921.8
2040	7.50%	2041/2042	5.78%	9.06	5,027.9	722.2	8,123.3	2,199.3	10.61	10.61	(200.7)	(2,918.2)	100.5	0.31	100.5	12.13	1,595.7
2041	7.50%	2042/2043	5.69%	5.74	4,984.3	290.2	8,568.0	2,199.3	7.32	7.32	(208.9)	(3,127.1)	101.3	0.77	101.3	8.86	1,200.8
2042	7.50%	2043/2044	5.60%	5.60	4,945.7	277.1	9,020.0	2,199.3	7.22	7.22	51.0	(3,076.1)	101.4	0.83	101.4	6.85	957.1
2043	7.50%	2044/2045	5.52%	5.52	4,913.7	271.4	9,477.9	2,199.3	7.17	7.17	72.0	(3,004.1)	101.0	0.62	101.0	6.87	959.9
2044	7.50%	2045/2046	5.45%	5.45	4,889.4	266.4	9,941.2	2,199.3	7.12	7.12	104.6	(2,899.6)	101.1	0.66	101.1	6.42	952.1
2045	7.50%	2046/2047	5.38%	5.38	4,874.9	262.3	10,408.0	2,199.3	7.08	7.08	138.0	(2,761.5)	101.1	0.68	101.1	6.18	944.6
2046	7.50%	2047/2048	5.32%	5.32	4,871.5	259.2	10,877.5	2,199.3	7.05	7.05	117.5	(2,644.0)	101.4	0.87	101.4	6.30	932.4
2047	7.50%	2048/2049	5.27%	5.27	4,881.5	257.1	11,347.9	2,199.3	7.01	7.01	93.0	(2,551.1)	101.4	0.94	101.4	6.44	1,045.5
2048	7.50%	2049/2050	5.22%	5.22	4,907.6	256.2	11,816.8	2,199.3	6.99	6.99	95.6	(2,455.5)	101.5	1.02	101.5	6.42	1,072.9
2049	7.50%	2050/2051	5.18%	5.18	4,950.0	256.5	12,284.5	2,199.3	6.96	6.96	91.5	(2,364.0)	101.6	1.09	101.6	6.43	1,108.6
2050	7.50%	2051/2052	5.15%	5.15	5,006.8	257.7	12,753.3	2,199.3	6.94	6.94	88.6	(2,275.4)	101.7	1.17	101.7	6.44	1,144.4

Baseline

**Summary Table - For Either SB 1082, A04826 Or SB 1082, A05049  
Using 30-Year Amortization Financing & No Changes to Act 120 Collars  
Pennsylvania State Employees' Retirement System  
Allocation of Potential Projected (Savings)/Cost Through FY 2052  
Due to Side-By-Side Hybrid Design, Including Changes to Current DB  
(Amounts in millions)**

**Benefit Changes**

Amendment - 1.00% DB Accrual (Ee 3.00%) for most hires after December 31, 2017	\$ (2,672.3)
Amendment - DC Plan (Ee 3.25%; Er 2.5%) for most hires after December 31, 2017	\$ 4,986.4
Amendment - Prospective Cost Neutral Option 4 for Pre-Act 120 Members	\$ (358.4)
Amendment - Greater of FAS 3 with No OT and FAS 5 on Future DB Accruals for Current DB Members Other Than State Police with 20 or more years of service; FAS 5 for Hybrid DB Members	<u>\$ (1,301.4)</u>
Sub-total Benefit Changes	\$ 654.3

**Total Hybrid Plan and Current DB Changes: (Savings)/Cost through FY 2052 without Financing Changes**

\$ 654.3

**Financing Changes**

New Entry Age Normal Cost Approach	\$ 516.7
Revised Amortization Period for Plan Changes From 10 to 30 Years	\$ (3,446.4)
Sub-total Financing Changes	\$ (2,929.7)

**Total Hybrid Plan and Current DB Changes: (Savings)/Cost through FY 2052 with Both Benefit and Financing Changes**

\$ (2,275.4)

Notes:

The potential (savings)/cost was valued in the following order:

1.00% accrual DB design generally effective after December 31, 2017

- State Police and most other hazardous duty employees exempt from both new DB and DC plans
- DB employee contribution rate: 3.00%
- Elected Officials: Includes change to lower accrual upon election/reelection: under SB 1082, A04826, current Elected Officials would have one-time opportunity to opt in to their current membership class upon post-2017 reelection; under SB 1082, A05049, no such opportunity would be available
- Does not include impact of changes to FAS 5 in Hybrid DB until later FAS step

DC Plan (Ee 3.25%; Er 2.5%) generally effective after December 31, 2017

- State Police and most other hazardous duty employees exempt from both new DB and DC plans

Current Member DB changes:

- Prospective Cost Neutral Option 4 effective after June 30, 2016
- Prospective Greater of FAS 3 No OT and FAS 5 for all except State Police with 20 or more years of service effective after December 31, 2016

Entry Age Normal Cost Method Changes

Revised Amortization Period for Decrease in UAL due to Legislated Plan Changes

- From 10 Years to 30 Years

If a different order is used, the cost impact will vary from what is shown above.

December 14, 2015

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Re: Official Cost Estimates for Senate Bill (SB) 1082  
Printer's Number (PN) 1460 & Variations Thereon

Dear Dave:

This letter is in response to requests for Hay Group's official cost estimates relating to the following three pieces of proposed legislation:

1. SB 1082, PN 1460
2. SB 1082, PN 1460, as amended by Amendment A04826
3. SB 1082, PN 1460, as amended by Amendment A05049

On December 3, 2015, Hay Group issued an actuarial cost note in connection with a Consensus Side-by-Side Hybrid design proposed on December 1, 2015. This cost note, a copy of which is enclosed with this letter, included detailed information concerning the cost impact of several variations of a proposed new pension design for the Pennsylvania State Employees' Retirement System (SERS), one of which is very similar to all three of the designs proposed in the above-listed legislative proposals. The variation of the Consensus Side-by-Side Hybrid design described in our December 3<sup>rd</sup> note that greatly resembles the above legislative proposals is the one under which the decrease in the unfunded accrued liability (UAL) that results from the legislation would be funded using a 30-year, level dollar amortization. Therefore, also enclosed with this letter are the following schedules:

- Our projection table showing projected SERS costs through the end of FY 2052 under the 30-year, level dollar amortization version of the Consensus Side-by-Side Hybrid proposal and
- Our Summary Table showing a breakdown of the long-term cumulative savings/cost of each of the key components of the Consensus Side-by-Side Hybrid proposal.

#### **Clarifications Relating to Enclosed Actuarial Cost Note**

- Shortly after the issuance of our December 3<sup>rd</sup> actuarial cost note, a question was raised in connection with the Public Employee Retirement Commission's (PERC's) review of this actuarial cost note and related schedules. This question pertained to Hay Group's handling of one particular provision of the Consensus Side-by-Side Hybrid design proposal, which was not addressed in our December 3<sup>rd</sup> cost note. Specifically, we were asked if we were aware of this provision of the proposal and if we had considered the cost implications of it.

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Below , we describe the specific provision that was questioned and Hay Group's handling of it.

*Proposed Change to Benefit Provisions Applicable to Class A-3 & Class A-4 Members*

Under the Consensus Side-by-Side Hybrid proposal, in addition to the legacy Defined Benefit (DB) system member changes fully described on pages 2 and 3 of Hay Group's December 3, 2015 actuarial cost note, there would be a change, effective July 1, 2016, to make an actuarially cost neutral Option 4 lump sum withdrawal (of member contributions and statutory interest) available to Class A-3 and Class A-4 members of SERS upon their retirement. This option is not currently available to A-3 and A-4 members. For these two classes of members, the cost neutral Option 4 calculation would be applicable to all member contributions and statutory interest thereon, whether they occurred before or after the July 1, 2016 effective date.

As you know, from our communications on this matter the day after the issuance of our cost note, although this provision was not included in our cost note discussion of the specific elements of the proposed legislation, we were fully aware of this provision while performing our cost analyses, we confirmed that this provision, if enacted, would have no future cost impact on SERS and, as a result, we stand by our December 3, 2015 actuarial cost note and related schedules as issued.

- More recently, another aspect of our December 3<sup>rd</sup> actuarial cost note was identified as requiring clarification, as follows: While the second bullet on page 3 of our note indicated that the proposal would extend the new Shared-Risk and Shared-Gain provisions to members of Class AA and Class D-4, in fact, the proposal would extend both of these provisions to members of Classes A, E1 and E2 as well. This broad applicability of the Shared-Risk and Shared-Gain provisions (whereby both are extended to all SERS legacy DB member classes) is also included in all three versions of Senate Bill 1082 being addressed in this letter.

**SB 1082, PN 1460 (hereafter, SB 1082)**

SB 1082 differs from the Consensus Side-by-Side Hybrid proposal covered by our enclosed December 3, 2015 actuarial cost note with respect to one aspect:



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Whereas under the Consensus Side-by-Side Hybrid proposal, current Elected Officials would be mandatorily enrolled in the new side-by-side hybrid (DB system and DC plan) upon reelection on or after January 1, 2018, under SB 1082, current Elected Officials would have a one-time opportunity to petition for reinstatement into their current (pre-SB 1082) SERS DB system membership class upon reelection on or after January 1, 2018.

Hay Group has concluded that, based upon the small percentage of Elected Officials currently in the SERS active membership (about 0.25%, i.e., about 260 out of approximately 104,000) and our expectation that most of the affected Elected Officials will not opt in to their current membership class upon re-election, this “opt-in” provision would have no material impact on our overall cost estimates issued on December 3, 2015.

Therefore, the two enclosed cost estimate schedules are our official cost estimates for SB 1082, and they show the same cost estimate results as the schedules referenced in our December 3, 2015 actuarial cost note. That is, we estimate that, if SB 1082 were to become law, it would result in a cumulative savings relative to SERS’ current plan baseline projected costs through the end of FY 2052 of \$2,099.7 million (or \$2.0997 billion).

**SB 1082, PN 1460, as amended by Amendment A04826 (hereafter, SB 1082, A04826)**

SB 1082, A04826 differs from SB 1082 with respect to one aspect:

Whereas under SB 1082, it is proposed that the Act 120 employer contribution collar of 4.5% for FY 2016-17 be revised to 2.25%, SB 1082, A04826 proposes no change in any of the Act 120 employer contribution collars. Hay Group has prepared cost estimates for a variation of the Consensus Side-by-Side Hybrid proposal that called for no change to the Act 120 employer contribution collars and these estimates also serve as our official cost estimates of SB 1082, A04826. The details of these estimates are attached, as follows:

- Our projection table showing projected SERS costs through the end of FY 2052 under the 30-year, level dollar amortization, with No Change to the Act 120 Collars, version of this Side-by-Side Hybrid proposal and
- Our Summary Table showing a breakdown of the long-term cumulative savings/cost of each of the key components of this version of the Side-by-Side Hybrid proposal.



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That is, we estimate that, if SB 1082, A04826 were to become law, it would result in a cumulative savings relative to SERS' current plan baseline projected costs through the end of FY 2052 of \$2,275.4 million (or \$2.2754 billion).

**SB 1082, PN 1460, as amended by Amendment A05049 (hereafter, SB 1082, A05049)**

SB 1082, A05049 differs from SB 1082, A04826 with respect to one aspect:

Whereas under SB 1082, A04826, current Elected Officials would have a one-time opportunity to petition for reinstatement into their current (pre-SB 1082) SERS DB system membership class upon reelection on or after January 1, 2018, under SB 1082, A05049, current Elected Officials would be mandatorily enrolled in the new side-by-side hybrid (DB system and DC plan) upon reelection on or after January 1, 2018.

Since Hay Group concluded (as described above) that this "opt-in" provision would have no material impact on our overall cost estimates, our official cost estimates of SB 1082, A05049 are approximately the same as those presented above for SB 1082, A04826. That is, we estimate that, if SB 1082, A05049 were to become law, it would have approximately the same cost impact as if SB 1082, A04826 were to become law; namely, it would result in a cumulative savings relative to SERS' current plan baseline projected costs through the end of FY 2052 of \$2,275.4 million (or \$2.2754 billion).

**Important Notes**

Please note the following regarding our handling of the attached funding projections:

1. In performing our cost analyses and preparing the attachments to this letter, Hay Group has applied the proposed changes to current law as presented to us. We have not reviewed or opined on the legality of any aspect of these proposals.
2. Hay Group's past convention of showing results for employer cost projections such as these as percentages of payroll to two decimal places may be somewhat misleading. This level of precision is not really possible for estimates of this nature.
3. All of these projections are based upon the expectation that (i) for all years after 2014, the actual economic and demographic experience of SERS will be consistent with the

Mr. David E. Durbin  
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underlying actuarial valuation assumptions and (ii) all employer contribution amounts shown in the "Expected FY Contribution" columns will, in fact, be contributed.

4. The attached projection schedules include a particularly important column of information that may warrant further explanation: "Cumulative (Savings) / Cost Relative to Baseline" shows the projected cumulative cost or savings in employer contributions (in millions of dollars) that would result under the stated legislative proposal versus under the current law (Baseline).
5. The cost estimates included herein were based upon our December 31, 2014 actuarial valuation results, including the underlying census data, assets and actuarial assumptions.

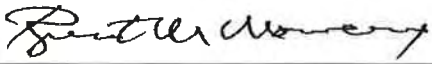
**Actuarial Certification**


To the best of our knowledge, the information we are presenting herein is complete and accurate and all costs and liabilities have been determined in conformance with generally accepted actuarial principles and on the basis of actuarial assumptions and methods which are reasonable (taking into account the past experience of SERS and reasonable expectations) and which represent our best estimate of anticipated experience under the plan.

The actuaries certifying to these valuations and related actuarial projections are members of the Society of Actuaries or other professional actuarial organizations, and meet the General Qualification Standards of the American Academy of Actuaries for purposes of issuing Statements of Actuarial Opinion.

Please let us know if you have any questions on any of this.

Respectfully submitted,  
Hay Group, Inc.

By:   
Brent M. Mowery, F.S.A.  
Member American Academy of Actuaries  
Enrolled Actuary No. 14-3885

By:   
Craig R. Graby  
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**Actuarial Cost Note -  
Projected Impact of Consensus Side-by-Side Hybrid Pension Design  
Proposed on December 1, 2015**

As requested, in connection with the Consensus Side-by-Side Hybrid pension design proposed on December 1, 2015, we have performed cost projections to approximate the impact on the future funding of the Pennsylvania State Employees' Retirement System (SERS) if this proposal were to become law. This proposal calls for a hybrid defined benefit (DB)/defined contribution (DC) plan design for SERS, to take the place of the current DB only system. That is, under this proposal (hereafter referred to as the "Consensus Hybrid proposal"), most employees who join SERS on or after January 1, 2018 would no longer be covered by SERS' current DB only design, but rather would be covered by a hybrid DB/DC plan design including key features as described in the pages that follow.

This Consensus Hybrid proposal also calls for revisions to several of the current SERS DB provisions that would be applied on a prospective basis to virtually all current (pre-2017) SERS members. These changes are also described below.

Under the Consensus Hybrid proposal, on multiple different effective dates, various significant changes would occur to the current provisions of both of Pennsylvania's statewide retirement systems. This note addresses only the changes applicable to SERS.

**Exemption for Most Hazardous Duty Employees**

Under this Consensus Hybrid proposal, most hazardous duty employees (including Pennsylvania State Police, correction officers, enforcement officers and all other hazardous duty employees other than psychiatric security aides) would be exempt from certain provisions of the proposed new plan design. That is, (a) hazardous duty members hired after 2017 would be exempt from the Consensus Hybrid proposal provision that requires all post-2017 hires to join the new defined contribution (DC) plan and revised DB system; rather, they would continue to become members of the current SERS DB system only. On the other hand, (b) hazardous duty members who are active after July 1, 2016, regardless of their hire date, would be subject to the same Consensus Hybrid proposal legacy DB changes that will become applicable to virtually all active legacy DB system members.

References hereafter in this note to "all employees hired after the hybrid plan start date" being subject to the proposed new hybrid DB/DC plan provisions should be understood, if not specifically excepted, to exclude most hazardous duty employees.

**Summary**

The Consensus Hybrid proposal calls for a combination of changes to occur, primarily on three different effective dates, as follows:

- Effective July 1, 2016 and January 1, 2017, changes will occur to the future benefit rights of virtually all current (pre-2017) active SERS DB members. These changes (described fully in the pages that follow) will only affect benefits relating to future (post-effective date) service. Benefits relating to service prior to the effective date will continue as-is and not be impacted.
- A new SERS Defined Contribution (DC) plan and a revised version of the SERS Defined Benefit (DB) system will be implemented for those hired after December 31, 2017. As well, effective January 1, 2018, all active SERS members who are “elected officers” (regardless of their membership class) will not be allowed to continue membership in the current SERS DB system but instead, will be required to join the new DC plan and revised DB system upon election or re-election.

Descriptions of the key features of each of these changes proposed under the Consensus Hybrid proposal follow.

#### **Changes in Benefit Provisions Applicable to Legacy DB System Members**

Under the Consensus Hybrid proposal, changes would occur, some effective July 1, 2016 and some effective January 1, 2017, to the future benefit rights of virtually all active legacy DB (pre-2017) system members. These changes will not affect benefits relating to service prior to the effective date of each change. That is, “pre-change” accrued benefits will continue as-is.

Our brief descriptions of the two primary types of benefit provision changes follow.

#### **(1) Actuarially Neutral Option 4 Relating to Post-July 1, 2016 Member Contributions**

The Consensus Hybrid proposal calls for a change to become applicable to all legacy DB members who, as of June 30, 2016, remain eligible for the “actuarially favorable (to the member)” Option 4 withdrawal. Specifically, all member contributions made on or after July 1, 2016 and all statutory interest on those contributions, if withdrawn under Option 4, will be subject to an actuarially neutral Option 4 calculation (which is less favorable to the member than the calculation relating to the pre-July 1, 2016 contributions and statutory interest thereon).

#### **(2) Revised Final Average Salary for Post-2016 Service**

The Consensus Hybrid proposal calls for changes effective January 1, 2017 to the current (generally three-year) Final Average Salary calculation applicable to all legacy DB members other than state police who qualify for the “DiLauro Award” (who will continue to have their benefits based upon their highest year salary, inclusive of overtime). The new FAS will be the higher of (a) or (b) below, where:

(a) = Current 3-Year Final Average Salary, but excluding post-12/31/2016 overtime and

(b) = New 5-Year Final Average Salary, including post-12/31/2016 overtime



Two other changes in the post-July 1, 2016 benefit provisions applicable to legacy DB system members that are included in the Consensus Hybrid proposal are worthy of mention here:

- For Class A-3 and Class A-4 members, for whom a new Shared-Risk provision became applicable under Act 120 (subjecting them to a potential increase in their employee contribution rate by as much as 2.0% in the event of underperformance of SERS investments), the Consensus Hybrid proposal has introduced a new Shared-Gain provision. This Shared-Gain provision mirrors the Shared-Risk provision, in that it subjects these same classes of members to a potential decrease in their employee contribution rate by as much as 2%, in the event of over performance of SERS investments.
- For Class AA and Class D-4, the Consensus Hybrid proposal has also introduced new Shared-Risk and Shared-Gain provisions similar to those discussed above for Class A-3 and Class A-4 members. Under these provisions, the performance of SERS investments would be measured every three years. In the event of over performance during this period, the Shared-Gain provision could result in the employee contribution rate being reduced. The downward-adjusted rate would then be in effect for the following three years, after which new performance measurements would govern contribution rate levels.

Given that the assumption used in our Consensus Hybrid proposal cost analyses is that the SERS fund will consistently earn 7.5% annual investment returns in all years after December 31, 2014 (consistent with our current actuarial valuation assumptions), neither the Shared-Gain nor the Shared-Risk provisions have any cost implications of relevance for this Cost Note.

### **Transition to the Consensus Hybrid Design**

Most, but not all, non-hazardous duty employees who join SERS on or after January 1, 2018, would be covered by the proposed new hybrid DB/DC design, and therefore, upon hire, would become members of the hybrid DB system and participants of the hybrid DC plan. For “elected officers” (including: (1) newly elected or re-elected governor, lieutenant governor, treasurer, auditor general, attorney general, and legislators and (2) members of the judiciary who are elected to a new judicial position), the hybrid design would become applicable coincident with their assuming office, but not prior to January 1, 2018.

The Consensus Hybrid proposal would mandate that, with the exceptions as noted herein, all employees hired after the hybrid plan start date (January 1, 2018) become participants in a new SERS hybrid DC plan, which would be separate from the SERS DB system. It is anticipated that each hybrid DC participant would have established for him/her an individual investment account within a SERS hybrid DC trust fund, which would be separate from the SERS DB fund.

The Consensus Hybrid proposed legislation would create a new class of DB membership, Class A-5, applicable to all SERS employees who are hired after the hybrid plan start date. This class would be a new tier within the existent SERS DB system; the new structure would not be a

separate plan and would not have a separate fund. Under this proposal, SERS would not be closed to new members; SERS would remain open into the future to members who join the SERS DB system via the new hybrid membership class. Note: Current SERS members (hired prior to 2018) would not have an option to leave their existing classes of service and join the hybrid plan.

**Specifics of the Consensus Hybrid Proposed Design**

This summarizes our understanding of the key features of this proposed hybrid DB/DC design:

1. Formula for Single Life Annuity at Superannuation for New Hybrid DB members:  
 $1\% \times 5\text{-Year Final Average Salary (including overtime)} \times \text{Total Credited Service}$

No “buy-up” to a higher benefit accrual rate would be available, as under Act 120.

The Final Average Salary (FAS) would generally be calculated by averaging the five highest calendar years of compensation, including overtime pay as applicable.

Note: While State Police hired January 1, 2018 and after are generally exempt from the Consensus Hybrid DB/DC design, including the 5-Year FAS described above, they ARE subject to the same (greater of) FAS provision generally applicable to the post-2016 service of legacy DB members if they separate from service prior to becoming eligible for the DiLauro award. If they reach DiLauro eligibility, the current DiLauro award provisions would continue to apply. New State Police will need at least 20 years of State Police service to be eligible since non-State Police service will no longer count toward the DiLauro eligibility. Non-State Police service will provide a benefit in addition to the DiLauro award.

2. Contribution Rates under Consensus Hybrid Design: See table that follows for a summary of the Consensus Hybrid proposed contribution rates, expressed as a percentage of payroll.

Consensus Hybrid Defined Benefit (DB)/ Defined Contribution (DC) Design Mandatory Contribution Rates (As % of Payroll)	
<b>Defined Benefit (DB)</b>	
Employee	3.00%
Employer	Actuarially Determined
<b>Defined Contribution (DC)</b>	
Employee	3.25%
Employer	2.50%

3. Hybrid DB Superannuation (i.e., Normal Retirement Age): Eligibility and benefits would generally be consistent with the Act 120 provisions applicable to members of the same class and category.

4. Hybrid DB Early Retirement: Eligibility and benefits would generally be consistent with the Act 120 provisions applicable to members of the same class and category.
5. Hybrid DB Vesting: 10-year cliff. Refund of accumulated deductions (member contributions + 4% statutory interest) would be available, upon non-vested termination.
6. Hybrid DB Disability and Death Benefits: Eligibility and benefits would generally be consistent with the Act 120 provisions applicable to members of the same class and category.
7. Hybrid DB Shared-Risk/Gain Provision: If DB fund investment returns are low/high relative to actuarial assumptions, hybrid DB members could be subject to higher/lower employee contribution rates, with the potential maximum deviation from the usual mandatory contribution rate being + or - 2% of pay. Projections attached to this note are based on an assumption that the target investment returns (of 7.5% annually) are earned in all future years; therefore, for purposes of this cost note, this provision would not impact future SERS costs.
8. Hybrid DB Option 4: Upon retirement, hybrid DB members will be eligible for an actuarially cost neutral Option 4 full withdrawal of their accumulated deductions.
9. Hybrid DC Vesting: 3-year cliff for employer contributions and related earnings/losses; immediate vesting for employee contributions and related earnings/losses.
10. Hybrid DC Disability and Death Benefits: Vested account balances would generally be available.

#### **Changes to Current SERS Financing Provisions Under the Consensus Hybrid Proposal**

In accordance with our interpretation of the draft provisions of the Consensus Hybrid proposal:

- We have changed the actuarial funding method being utilized for the determination of the SERS normal cost rate from the current funding method (a variation of the Entry-Age Actuarial Cost Method) to the traditional Entry-Age Actuarial Cost Method. The significant difference between the method currently used for SERS and the method proposed under the Consensus Hybrid proposal is that the normal cost is currently based upon the benefits and contributions for the average new employee whereas, under the proposed method, the normal cost is based upon the benefits and contributions for all current covered employees from their date of entry.
- If the legislation resulting from this proposal causes there to be a change in the SERS unfunded accrued liability (UAL) (and it most certainly would), then under current law, that change in liability would be funded using a 10-year, level-dollar amortization. However, there is some uncertainty as to whether the change in UAL that would result

from this proposal would be amortized over 10 years as prescribed by current law or over a longer period, such as 20 to 30 years. For purposes of this cost note, in order to be more informative to those reviewing these results, we have performed our SERS cost calculations based upon each of three possible level-dollar amortization periods: 10 years, 20 years and 30 years.

- Under this Consensus Hybrid proposal, a change is proposed to the employer contribution collars that are scheduled under current law (as established under Act 2010-120). Specifically, this proposal calls for (i) the maximum employer contribution rate for the 2016/2017 fiscal year to be the sum of a contribution collar of 2.25% of payroll added to the final 2015/2016 fiscal year contribution requirement of 25.00% of payroll, to produce a result of 27.25% of payroll and (ii) the use of a 4.5% of payroll contribution collar for purposes of determining collared contribution rates in subsequent fiscal years (fiscal 2017/2018 and beyond). Note that the only difference between the two sets of collars is that the current law collar for the 2016/2017 fiscal year is 4.5% of payroll whereas the proposed collar for the 2016/2017 fiscal year is 2.25% of payroll.

#### **Estimated Initial Cost Impact of the Consensus Hybrid Proposal on the SERS DB System**

If the Consensus Hybrid proposal were to become law, effective in fiscal 2016/2017, the SERS employer normal cost rate would be based upon the new traditional Entry-Age Actuarial Cost Method (as described in the first bullet above). Under this new method the resulting normal cost rate is 9.72% of payroll, a considerably higher rate than the 4.95% of payroll normal cost rate in fiscal 2015/2016. This change results in significantly increased normal cost rates (versus the prior year rate of 4.95%) over our entire cost projection period, and we have determined that the present value of those future normal cost dollar increases is approximately \$3.5 billion. Therefore, in conjunction with our projected December 31, 2015 actuarial valuation, approximately \$3.5 billion of SERS liability, previously scheduled to be funded via UAL amortization payments, would instead be funded via future employer normal cost payments. The net effect of the higher normal cost funding pattern and the lower UAL amortization funding pattern over our cost projection period is a cost, since the increase in future normal cost payments is of greater magnitude than the decrease in future UAL amortization payments. It should be noted that this decrease in UAL would cause the SERS funded status to increase by more than 5 percent. These changes are reflected (though masked by the impact of other changes) in our Consensus Hybrid proposal funding projections attached to this note.

#### **Projection of Future Costs Under the Consensus Hybrid Proposal**

Starting with the census data, asset data and actuarial assumptions underlying our December 31, 2014 actuarial valuation (including an assumed investment return of 7.5 percent per year, compounded annually) and projecting our December 31, 2014 valuation results forward to December 31, 2015 and implementing the new traditional Entry-Age Actuarial Cost Method for the December 31, 2015 and all subsequent actuarial valuations and incorporating the new benefit provisions (effective either July 1, 2016 or January 1, 2017) to legacy DB members of



SERS as described above and incorporating the new Hybrid DB plan design outlined above for new hires on or after January 1, 2018 and incorporating the new Hybrid DC plan design outlined above for new entrants to SERS on or after January 1, 2018 and reflecting the two changes to the current SERS financing provisions as described in the second and third bullets above, Hay Group has projected the future employer contributions required to fund SERS and the new DC plan in accordance with the Consensus Hybrid proposal.

### **Schedules Attached to This Cost Note**

We have attached to this note the results of our funding projections and other relevant cost information, as follows:

- **Three Consensus Hybrid Projection Results:** These three one-page cost projections show our projected annual funding of SERS if the Consensus Side-by-Side Hybrid design proposal (including the benefit and contribution provisions described previously) were to be enacted, including the revision to the traditional Entry-Age Actuarial Cost Method, and the change in Unfunded Actuarial Liability (UAL) resulting from this proposal were amortized on a level dollar basis over
  - 10 years,
  - 20 years or
  - 30 years respectively,
 including the (savings)/cost relative to baseline funding. Note that these three tables present our projections of future SERS funding through fiscal year 2051/2052, all of which reflect the impact of the Consensus Hybrid proposal.
- **Baseline Projection:** This table presents, for purposes of comparison, the results of our December 31, 2014 actuarial valuation and our projection of future funding through fiscal year 2051/2052, assuming no changes to any of the current SERS benefit provisions or financing methodologies.

Also attached are the following:

- **Three Summary Tables**, which provide breakdowns of the long-term cumulative (savings)/cost by the key components of the proposal, including, in the last four steps, the estimated impact of each of the proposed financing changes being considered in this proposal, including:
  - A change to the traditional Entry-Age Actuarial Cost Method (or, a revised normal cost approach)
  - Continuing with the current law 10-year level dollar amortization of the decrease in UAL due to this proposed legislation or
  - Changing from the current law 10-year level dollar amortization of the decrease in UAL due to this proposed legislation to, possibly, a 20-year level dollar amortization or
  - Changing from the current law 10-year level dollar amortization of the decrease in UAL due to this proposed legislation to, possibly, a 30-year level dollar amortization) and
  - A possible change in contribution collars,

- One last one-page attachment that we have included herein to provide further information for those reviewing the details of these cost analyses: A schedule of Net Present Values of the net Cost/(Savings) that would result if the Consensus Hybrid proposal became law.

### **Our Cost Results in Brief**

As shown in our attached cost projections for this proposed Consensus Hybrid design, if this proposal were to become law, we estimate that it would result in a cumulative cost/savings relative to our current plan baseline projected costs through the end of FY 2052 as follows:

- Cumulative cost of \$1,171.0 million (or \$1.1710 billion), if the decrease in UAL were amortized over 10 years,
- Cumulative savings of \$740.3 million (or \$0.7403 billion), if the decrease in UAL were amortized over 20 years and
- Cumulative savings of \$2,099.7 million (or \$2.0997 billion), if the decrease in UAL were amortized over 30 years.

It should be noted that the proposed financing change to reduce employer contribution collars had the following cost/savings impact:

- Based upon a 10-year UAL amortization, the reduced collars had no impact. That is, the fiscal 2016/2017 projected employer contribution rate (26.79%) was lower than the 27.25% of payroll collared contribution level, thereby ending the applicability of contribution collars to subsequent years.
- Based upon a 20-year UAL amortization, the reduced collars increased costs by about \$208 million. This was due to the fact that the fiscal 2016/2017 projected employer contribution rate was higher than the 27.25% of payroll collared contribution level; however, the fiscal 2017/2018 projected employer contribution rate was lower than the 31.75% of payroll collared contribution level, thereby ending the applicability of contribution collars to subsequent years.
- Based upon a 30-year UAL amortization, the reduced collars increased costs by about \$176 million. This was due to the fact that the fiscal 2016/2017 projected employer contribution rate was higher than the 27.25% of payroll collared contribution level; however, the fiscal 2017/2018 projected employer contribution rate was lower than the 31.75% of payroll collared contribution level, thereby ending the applicability of contribution collars to subsequent years

### **Important Notes**

Please note the following regarding our handling of the attached funding projections:

1. In performing our cost analyses and preparing this cost note and the attachments hereto, Hay Group has applied the proposed changes to current law as presented to us. We have not reviewed or opined on the legality of any aspect of this proposal.
2. Hay Group's past convention of showing results for employer cost projections such as these as percentages of payroll to two decimal places may be somewhat misleading. This level of precision is not really possible for estimates of this nature.
3. All of these projections are based upon the expectation that (i) for all years after 2014, the actual economic and demographic experience of SERS will be consistent with the underlying actuarial valuation assumptions and (ii) all employer contribution amounts shown in the "Expected FY Contribution" columns will, in fact, be contributed.
4. The attached projection schedules include a particularly important column of information that may warrant further explanation: "Cumulative (Savings) / Cost Relative to Baseline" shows the projected cumulative cost or savings in employer contributions (in millions of dollars) that would result under the Consensus Hybrid proposal versus under the current law (Baseline).
5. The cost estimates included herein were based upon our December 31, 2014 actuarial valuation results, including the underlying census data, assets and actuarial assumptions.

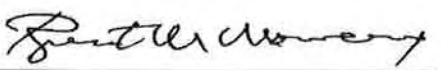
### **Actuarial Certification**

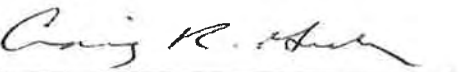
To the best of our knowledge, the information we are presenting herein is complete and accurate and all costs and liabilities have been determined in conformance with generally accepted actuarial principles and on the basis of actuarial assumptions and methods which are reasonable (taking into account the past experience of SERS and reasonable expectations) and which represent our best estimate of anticipated experience under the plan.

The actuaries certifying to this valuation are members of the Society of Actuaries or other professional actuarial organizations, and meet the General Qualification Standards of the American Academy of Actuaries for purposes of issuing Statements of Actuarial Opinion.

Please let us know if you have any questions on any of this.

Respectfully submitted,  
Hay Group, Inc.

By:   
Brent M. Mowery, F.S.A.  
Member American Academy of Actuaries  
Enrolled Actuary No. 14-3885

By:   
Craig R. Graby  
Member American Academy of Actuaries  
Enrolled Actuary No. 14-7319

December 3, 2015

SERS Projected 30 Year Contributions  
(Based Upon Final December 31, 2014 Valuation)

Consensus Side By Side Hybrid DB/DC Design 12/01/2015 = Legacy DB Plan With New Provisions, Including New 1.00% Accrual Defined Benefit Tier, Plus New DC Plan (DC/DB) With Er Contrib @ 2.5%; State Police, Correction Officers, and Other Hazardous Duty ONLY Remain in Current DB Plan; No Fresh Start; No Legacy Contribution/Accrual Rate Changes; Traditional Entry Age Normal Cost; Revised Contribution Collars; Cost of Legislation Amortized Over 30 Years

Year	Investment Return	Fiscal Year	Floor Contribution	Projected DB Contribution	Expected DB Plan Payroll (\$ in millions)	Expected DB Contribution (\$ in millions)	Expected FY DC/DB Plan FY Payroll (\$ in millions)	Expected DC/DB Contribution (\$ in millions)	Total DB+DC/DB Contribution (\$ in millions)	DB+DC/DB Contribution as a % of DB+DC/DB Pay	Annual (Savings) / Cost Relative to Baseline	Cumulative (Savings) / Cost Relative to Baseline	Funded Ratio (AV%)	Funded Ratio (MW%)	UAL (\$ in billions)	Baseline Percent	Baseline \$ (\$ in millions)
2011	7.50%	2012/2013	5.10%	11.50	5,890.7	677.4	677.4	11.50	677.4	11.50	(139.7)	(139.7)	65.3	57.6	14.69	11.50	677.4
2012	7.50%	2013/2014	5.01%	16.00	5,836.4	933.8	933.8	16.00	933.8	16.00	(39.8)	(179.4)	58.7	58.9	17.78	16.00	933.8
2013	7.50%	2014/2015	5.00%	20.50	5,897.6	1,209.0	1,209.0	20.50	1,209.0	20.50	(45.1)	(219.3)	59.2	62.4	17.90	20.50	1,209.0
2014	7.50%	2015/2016	4.95%	25.00	6,021.7	1,505.4	1,505.4	25.00	1,505.4	25.00	(49.9)	(314.3)	59.4	61.1	18.17	25.00	1,505.4
2015	7.50%	2016/2017	9.72%	27.25	6,205.3	1,690.9	1,690.9	27.25	1,690.9	27.25	(54.7)	(369.0)	65.4	67.1	14.43	29.50	1,830.6
2016	7.50%	2017/2018	9.57%	29.74	6,277.3	1,890.6	1,890.6	29.74	1,890.6	29.74	(59.6)	(428.6)	67.1	67.7	14.06	30.41	1,944.5
2017	7.50%	2018/2019	9.34%	28.66	6,233.5	1,855.1	1,855.1	28.66	1,855.1	28.66	(64.8)	(493.4)	68.7	68.7	13.62	29.40	1,937.1
2018	7.50%	2019/2020	9.11%	27.93	6,173.5	1,840.2	1,840.2	27.93	1,840.2	27.93	(70.1)	(563.5)	69.8	69.9	13.42	28.82	1,957.0
2019	7.50%	2020/2021	8.90%	27.13	6,130.2	1,821.2	1,821.2	27.13	1,821.2	27.13	(75.7)	(639.3)	70.9	71.0	13.13	28.15	1,970.0
2020	7.50%	2021/2022	8.70%	26.37	6,088.0	1,803.9	1,803.9	26.37	1,803.9	26.37	(81.6)	(720.8)	72.1	72.1	12.82	27.52	1,984.4
2021	7.50%	2022/2023	8.51%	25.65	6,046.0	1,788.1	1,788.1	25.65	1,788.1	25.65	(87.6)	(808.4)	73.1	73.1	12.50	26.92	2,000.2
2022	7.50%	2023/2024	8.32%	24.95	6,001.4	1,772.9	1,772.9	24.95	1,772.9	24.95	(93.7)	(902.1)	74.2	74.2	12.17	26.34	2,016.9
2023	7.50%	2024/2025	8.13%	24.27	5,953.3	1,757.8	1,757.8	24.27	1,757.8	24.27	(100.0)	(1,008.1)	75.2	75.2	11.80	25.78	2,034.0
2024	7.50%	2025/2026	7.95%	23.61	5,902.1	1,742.9	1,742.9	23.61	1,742.9	23.61	(106.4)	(1,108.1)	76.3	76.3	11.41	25.23	2,051.7
2025	7.50%	2026/2027	7.78%	22.97	5,848.6	1,728.3	1,728.3	22.97	1,728.3	22.97	(113.0)	(1,221.5)	77.3	77.3	11.00	24.70	2,070.0
2026	7.50%	2027/2028	7.61%	22.35	5,794.6	1,714.3	1,714.3	22.35	1,714.3	22.35	(120.0)	(1,341.5)	78.4	78.4	10.55	24.19	2,089.0
2027	7.50%	2028/2029	7.44%	21.75	5,741.4	1,700.8	1,700.8	21.75	1,700.8	21.75	(127.2)	(1,468.7)	79.5	79.5	10.07	23.69	2,108.5
2028	7.50%	2029/2030	7.29%	21.17	5,687.3	1,687.8	1,687.8	21.17	1,687.8	21.17	(134.2)	(1,603.0)	80.6	80.6	9.55	23.21	2,128.6
2029	7.50%	2030/2031	7.13%	20.61	5,631.7	1,675.1	1,675.1	20.61	1,675.1	20.61	(141.5)	(1,744.5)	81.8	81.8	8.99	22.74	2,149.3
2030	7.50%	2031/2032	6.98%	20.06	5,574.5	1,662.8	1,662.8	20.06	1,662.8	20.06	(149.0)	(1,893.4)	83.1	83.1	8.39	22.29	2,170.7
2031	7.50%	2032/2033	6.84%	19.53	5,514.5	1,650.6	1,650.6	19.53	1,650.6	19.53	(156.5)	(2,049.9)	84.4	84.4	7.75	21.85	2,192.8
2032	7.50%	2033/2034	6.70%	19.01	5,453.9	1,638.8	1,638.8	19.01	1,638.8	19.01	(164.2)	(2,214.1)	85.7	85.7	7.05	21.42	2,215.6
2033	7.50%	2034/2035	6.57%	18.52	5,395.8	1,627.8	1,627.8	18.52	1,627.8	18.52	(172.2)	(2,386.3)	87.2	87.2	6.31	21.01	2,239.0
2034	7.50%	2035/2036	6.44%	18.04	5,340.5	1,617.4	1,617.4	18.04	1,617.4	18.04	(180.2)	(2,566.6)	88.8	88.8	5.51	20.61	2,263.2
2035	7.50%	2036/2037	6.32%	17.57	5,287.0	1,607.5	1,607.5	17.57	1,607.5	17.57	(188.3)	(2,754.9)	90.5	90.5	4.65	20.22	2,288.2
2036	7.50%	2037/2038	6.20%	17.12	5,233.4	1,598.1	1,598.1	17.12	1,598.1	17.12	(196.5)	(2,951.4)	92.3	92.3	3.72	19.84	2,314.0
2037	7.50%	2038/2039	6.09%	16.69	5,179.3	1,588.9	1,588.9	16.69	1,588.9	16.69	(204.8)	(3,157.2)	94.4	94.4	2.73	19.48	2,340.5
2038	7.50%	2039/2040	5.98%	16.26	5,126.3	1,580.1	1,580.1	16.26	1,580.1	16.26	(212.2)	(3,372.4)	96.5	96.5	1.66	19.12	2,367.9
2039	7.50%	2040/2041	5.88%	15.84	5,075.4	1,571.4	1,571.4	15.84	1,571.4	15.84	(220.8)	(3,597.2)	98.9	98.9	0.51	15.06	1,921.8
2040	7.50%	2041/2042	5.78%	15.45	5,027.9	1,563.6	1,563.6	15.45	1,563.6	15.45	(229.7)	(3,832.9)	100.5	100.5	(0.25)	12.13	1,595.7
2041	7.50%	2042/2043	5.69%	15.03	4,984.3	1,556.0	1,556.0	15.03	1,556.0	15.03	(239.0)	(4,088.9)	101.5	101.5	(0.71)	8.86	1,200.8
2042	7.50%	2043/2044	5.60%	14.62	4,945.7	1,549.1	1,549.1	14.62	1,549.1	14.62	(249.0)	(4,357.9)	101.7	101.7	(0.78)	6.85	957.1
2043	7.50%	2044/2045	5.52%	14.22	4,913.7	1,542.4	1,542.4	14.22	1,542.4	14.22	(259.7)	(4,648.6)	101.3	101.3	(0.59)	6.67	959.9
2044	7.50%	2045/2046	5.45%	13.83	4,889.4	1,536.4	1,536.4	13.83	1,536.4	13.83	(270.8)	(4,969.4)	101.4	101.4	(0.62)	6.42	952.1
2045	7.50%	2046/2047	5.38%	13.45	4,874.9	1,531.0	1,531.0	13.45	1,531.0	13.45	(282.3)	(5,311.7)	101.4	101.4	(0.64)	6.18	944.6
2046	7.50%	2047/2048	5.32%	13.08	4,871.5	1,526.2	1,526.2	13.08	1,526.2	13.08	(294.7)	(5,686.4)	101.9	101.9	(0.83)	6.30	992.4
2047	7.50%	2048/2049	5.27%	12.72	4,861.5	1,521.7	1,521.7	12.72	1,521.7	12.72	(307.6)	(6,104.0)	102.1	102.1	(0.89)	6.44	1,045.5
2048	7.50%	2049/2050	5.22%	12.37	4,907.6	1,517.4	1,517.4	12.37	1,517.4	12.37	(321.0)	(6,565.0)	102.3	102.3	(0.96)	6.42	1,072.9
2049	7.50%	2050/2051	5.18%	12.02	4,950.0	1,513.5	1,513.5	12.02	1,513.5	12.02	(335.0)	(7,060.0)	102.5	102.5	(1.03)	6.43	1,108.6
2050	7.50%	2051/2052	5.15%	11.67	5,006.8	1,510.0	1,510.0	11.67	1,510.0	11.67	(349.5)	(7,599.5)	102.8	102.8	(1.10)	6.44	1,144.4

**Summary Table - Using 30-Year Amortization Financing**

**Pennsylvania State Employees' Retirement System  
Allocation of Potential Projected (Savings)/Cost Through FY 2052  
Due to Consensus Side-By-Side Hybrid Design 12/01/2015, Including Changes to Current DB  
(Amounts in millions)**

**Benefit Changes**

Amendment - 1.00% DB Accrual (Ee 3.00%) for most hires after December 31, 2017	\$ (2,672.3)
Amendment - DC Plan (Ee 3.25%; Er 2.5%) for most hires after December 31, 2017	\$ 4,986.4
Amendment - Prospective Cost Neutral Option 4 for Pre-Act 120 Members	\$ (358.4)
Amendment - Greater of FAS 3 with No OT and FAS 5 on Future DB Accruals for Current DB Members Other Than State Police with 20 or more years of service; FAS 5 for Hybrid DB Members	\$ (1,301.4)
Sub-total Benefit Changes	\$ 654.3

**Total Hybrid Plan and Current DB Changes: (Savings)/Cost through FY 2052 without Financing Changes**

\$ 654.3

**Financing Changes**

New Entry Age Normal Cost Approach	\$ 516.7
Revised Amortization Period for Plan Changes From 10 to 30 Years	\$ (3,446.4)
Revised Contribution Collars	\$ 175.7
Sub-total Financing Changes	\$ (2,754.0)

**Total Hybrid Plan and Current DB Changes: (Savings)/Cost through FY 2052 with Both Benefit and Financing Changes**

\$ (2,099.7)

**Notes:**

The potential (savings)/cost was valued in the following order:

- 1.00% accrual DB design generally effective after December 31, 2017
  - State Police and most other hazardous duty employees exempt from both new DB and DC plans
  - DB employee contribution rate: 3.00%
  - Elected Officials: Includes change to lower accrual upon election/reelection
  - Does not include impact of changes to FAS 5 in Hybrid DB until later FAS step
- DC Plan (Ee 3.25%; Er 2.5%) generally effective after December 31, 2017
  - State Police and most other hazardous duty employees exempt from both new DB and DC plans
- Current Member DB changes:
  - Prospective Cost Neutral Option 4 effective after June 30, 2016
  - Prospective Greater of FAS 3 No OT and FAS 5 for all except State Police with 20 or more years of service effective after December 31, 2016
- Entry Age Normal Cost Method Changes
- Revised Amortization Period for Decrease in UAL due to Legislated Plan Changes
  - From 10 Years to 30 Years
- Revised Employer Contribution Collars

If a different order is used, the cost impact will vary from what is shown above.

SERS Projected Employer Contributions ( ) Upon Final December 31, 2014 Valuation) Under Senate Bill 1082, Printer's Number 1460

Consensus Side By Side Hybrid DB/DC Design 12/01/2015 = Legacy DB Plan With New Provisions, Including New 1.00% Accrual Defined Benefit Tier, Plus New DC Plan (DC/DB) With Er Contrib @ 2.5%, State Police, Correction Officers, and Other Hazardous Duty ONLY Remain in Current DB Plan; No Fresh Start; No Legacy Contribution/Accrual Rate Changes; Traditional Entry Age Normal Cost; Cost of Legislation Amortized Over 30 Years; Reduced Collar (FY2016-17: 2.25%)

Year	Investment Return	Fiscal Year	Floor Contribution	Projected DB Percent Contribution	Expected DB Plan FY Payroll Contribution (\$ in millions)	Expected DC/DB Plan FY Payroll Contribution (\$ in millions)	Expected DC/DB Contribution (\$ in millions)	Total DB+DC/DB Contribution (\$ in millions)	DB+DC/DB Pay a % of	Annual (Savings) / Cost Relative to Baseline	Cumulative (Savings) / Cost Relative to Baseline	Funded Ratio (AV%)	UAL (\$ in billions)	Funded Ratio (MV%)	Baseline Percent	Baseline \$ (\$ in millions)
2011	2.70%	2012/2013	5.10%	11.50	5,890.7	677.4	677.4	11.50	11.50	(39.7)	(139.7)	65.3	14.69	57.6	11.50	677.4
2012	12.00%	2013/2014	5.01%	16.00	5,836.4	933.8	933.8	16.00	16.00	-	-	58.7	17.78	58.9	16.00	933.8
2013	13.60%	2014/2015	5.00%	20.50	5,897.6	1,209.0	1,209.0	20.50	20.50	-	-	59.2	17.90	62.4	20.50	1,209.0
2014	6.40%	2015/2016	4.95%	25.00	6,021.7	1,505.4	1,505.4	25.00	25.00	-	-	59.4	18.17	61.1	25.00	1,505.4
2015	7.50%	2016/2017	9.72%	27.25	6,205.3	1,690.9	1,690.9	27.25	27.25	(139.7)	(139.7)	65.4	14.43	67.1	29.50	1,630.6
2016	7.50%	2017/2018	9.57%	29.74	6,277.3	1,890.6	1,890.6	29.74	29.74	(39.7)	(179.4)	67.1	14.06	67.7	30.41	1,944.5
2017	7.50%	2018/2019	9.34%	28.66	6,233.5	1,855.1	1,855.1	28.66	28.66	(39.8)	(193.3)	68.7	13.62	68.7	29.40	1,937.1
2018	7.50%	2019/2020	9.11%	27.93	6,173.5	1,840.2	1,840.2	27.93	27.93	(45.1)	(264.4)	69.8	13.42	69.9	28.82	1,957.0
2019	7.50%	2020/2021	8.90%	27.13	6,130.2	1,821.2	1,821.2	27.13	27.13	(49.9)	(314.3)	71.0	13.13	71.0	28.15	1,970.0
2020	7.50%	2021/2022	8.70%	26.37	6,088.0	1,803.9	1,803.9	26.37	26.37	(54.7)	(369.0)	72.1	12.82	72.2	27.52	1,984.4
2021	7.50%	2022/2023	8.51%	25.65	6,046.0	1,788.1	1,788.1	25.65	25.65	(59.6)	(428.6)	73.3	12.50	73.3	26.92	2,000.2
2022	7.50%	2023/2024	8.32%	24.95	6,001.4	1,772.9	1,772.9	24.95	24.95	(64.8)	(493.4)	74.4	12.17	74.4	26.34	2,016.9
2023	7.50%	2024/2025	8.13%	24.27	5,953.3	1,757.8	1,757.8	24.27	24.27	(70.1)	(563.5)	75.5	11.80	75.5	25.78	2,034.0
2024	7.50%	2025/2026	7.95%	23.61	5,902.1	1,742.9	1,742.9	23.61	23.61	(75.7)	(639.3)	76.6	11.41	76.6	25.23	2,051.7
2025	7.50%	2026/2027	7.78%	22.97	5,848.6	1,728.3	1,728.3	22.97	22.97	(81.6)	(720.8)	77.8	11.00	77.8	24.70	2,070.0
2026	7.50%	2027/2028	7.61%	22.35	5,794.6	1,714.3	1,714.3	22.35	22.35	(87.6)	(808.4)	78.9	10.55	78.9	24.19	2,089.0
2027	7.50%	2028/2029	7.44%	21.75	5,741.4	1,700.8	1,700.8	21.75	21.75	(93.7)	(902.1)	80.1	10.07	80.1	23.69	2,108.5
2028	7.50%	2029/2030	7.29%	21.17	5,687.3	1,687.8	1,687.8	21.17	21.17	(100.0)	(1,002.1)	81.3	9.55	81.3	23.21	2,128.6
2029	7.50%	2030/2031	7.13%	20.61	5,631.7	1,675.1	1,675.1	20.61	20.61	(106.4)	(1,108.5)	82.6	8.99	82.6	22.74	2,149.3
2030	7.50%	2031/2032	6.98%	20.06	5,574.5	1,662.8	1,662.8	20.06	20.06	(113.0)	(1,221.5)	83.9	8.39	83.9	22.29	2,170.7
2031	7.50%	2032/2033	6.84%	19.53	5,514.5	1,650.6	1,650.6	19.53	19.53	(120.0)	(1,341.5)	85.3	7.75	85.3	21.85	2,192.8
2032	7.50%	2033/2034	6.70%	19.01	5,453.9	1,638.8	1,638.8	19.01	19.01	(127.2)	(1,468.7)	86.8	7.05	86.8	21.42	2,215.6
2033	7.50%	2034/2035	6.57%	18.52	5,395.8	1,627.8	1,627.8	18.52	18.52	(134.2)	(1,603.0)	88.3	6.31	88.3	21.01	2,239.0
2034	7.50%	2035/2036	6.44%	18.04	5,340.5	1,617.4	1,617.4	18.04	18.04	(141.5)	(1,744.5)	89.8	5.51	89.8	20.61	2,263.2
2035	7.50%	2036/2037	6.32%	17.57	5,287.0	1,607.5	1,607.5	17.57	17.57	(149.0)	(1,893.4)	91.5	4.65	91.5	20.22	2,286.2
2036	7.50%	2037/2038	6.20%	17.12	5,233.4	1,598.1	1,598.1	17.12	17.12	(156.5)	(2,049.9)	93.3	3.72	93.3	19.84	2,314.0
2037	7.50%	2038/2039	6.09%	16.69	5,179.3	1,588.9	1,588.9	16.69	16.69	(164.2)	(2,214.1)	95.1	2.73	95.1	19.48	2,340.5
2038	7.50%	2039/2040	5.98%	16.26	5,126.3	1,580.1	1,580.1	16.26	16.26	(172.2)	(2,386.3)	97.1	1.66	97.1	19.12	2,367.9
2039	7.50%	2040/2041	5.88%	12.14	5,075.4	1,097.5	1,097.5	12.14	12.14	(180.2)	(2,566.6)	99.1	0.51	99.1	15.06	1,921.8
2040	7.50%	2041/2042	5.78%	9.16	5,027.9	734.6	734.6	9.16	9.16	(188.3)	(2,754.9)	100.4	(0.25)	100.4	12.13	1,595.7
2041	7.50%	2042/2043	5.69%	5.83	4,984.3	302.6	302.6	5.83	5.83	(196.5)	(2,951.4)	101.2	(0.71)	101.2	8.86	1,200.8
2042	7.50%	2043/2044	5.60%	5.60	4,945.7	277.1	277.1	5.60	5.60	51.0	(2,900.4)	101.3	(0.78)	101.3	6.85	957.1
2043	7.50%	2044/2045	5.52%	5.52	4,913.7	271.4	271.4	5.52	5.52	72.0	(2,828.4)	101.0	(0.59)	101.0	6.67	959.9
2044	7.50%	2045/2046	5.45%	5.45	4,889.4	266.4	266.4	5.45	5.45	104.6	(2,723.9)	101.0	(0.62)	101.0	6.42	952.1
2045	7.50%	2046/2047	5.38%	5.38	4,874.9	262.3	262.3	5.38	5.38	138.0	(2,585.8)	101.0	(0.64)	101.0	6.18	944.6
2046	7.50%	2047/2048	5.32%	5.32	4,871.5	259.2	259.2	5.32	5.32	117.5	(2,468.3)	101.3	(0.83)	101.3	6.30	992.4
2047	7.50%	2048/2049	5.27%	5.27	4,881.5	257.1	257.1	5.27	5.27	93.0	(2,375.4)	101.4	(0.89)	101.4	6.44	1,045.5
2048	7.50%	2049/2050	5.22%	5.22	4,907.6	256.2	256.2	5.22	5.22	95.6	(2,279.8)	101.4	(0.96)	101.4	6.42	1,072.9
2049	7.50%	2050/2051	5.18%	5.18	4,950.0	256.5	256.5	5.18	5.18	91.5	(2,188.3)	101.5	(1.03)	101.5	6.43	1,108.6
2050	7.50%	2051/2052	5.15%	5.15	5,006.8	257.7	257.7	5.15	5.15	88.6	(2,099.7)	101.6	(1.10)	101.6	6.44	1,144.4



**Summary Table - SB 1082, PN 1460**  
**Using 30-Year Amortization Financing & Reduced Collar (FY2016-17: 2.25%)**  
**Pennsylvania State Employees' Retirement System**  
**Allocation of Potential Projected (Savings)/Cost Through FY 2052**  
**Due to Side-By-Side Hybrid Design, Including Changes to Current DB**  
**(Amounts in millions)**

**Benefit Changes**

Amendment - 1.00% DB Accrual (Ee 3.00%) for most hires after December 31, 2017	\$ (2,672.3)
Amendment - DC Plan (Ee 3.25%; Er 2.5%) for most hires after December 31, 2017	\$ 4,986.4
Amendment - Prospective Cost Neutral Option 4 for Pre-Act 120 Members	\$ (358.4)
Amendment - Greater of FAS 3 with No OT and FAS 5 on Future DB Accruals for Current DB Members Other Than State Police with 20 or more years of service; FAS 5 for Hybrid DB Members	<u>\$ (1,301.4)</u>
Sub-total Benefit Changes	\$ 654.3
<b>Total Hybrid Plan and Current DB Changes: (Savings)/Cost through FY 2052 without Financing Changes</b>	<b>\$ 654.3</b>

**Financing Changes**

New Entry Age Normal Cost Approach	\$ 516.7
Revised Amortization Period for Plan Changes = From 10 to 30 Years	\$ (3,446.4)
Reduced Contribution Collar (FY2016-17: 2.25%)	<u>\$ 175.7</u>
Sub-total Financing Changes	\$ (2,754.0)
<b>Total Hybrid Plan and Current DB Changes: (Savings)/Cost through FY 2052 with Both Benefit and Financing Changes</b>	<b>\$ (2,099.7)</b>

Notes:

The potential (savings)/cost was valued in the following order:

- 1.00% accrual DB design generally effective after December 31, 2017
  - State Police and most other hazardous duty employees exempt from both new DB and DC plans
  - DB employee contribution rate: 3.00%
  - Elected Officials: Includes change to lower accrual upon election/reelection; however, current Elected Officials would have one-time opportunity to opt in to their current membership class upon post-2017 reelection
  - Does not include impact of changes to FAS 5 in Hybrid DB until later FAS step
- DC Plan (Ee 3.25%; Er 2.5%) generally effective after December 31, 2017
  - State Police and most other hazardous duty employees exempt from both new DB and DC plans
- Current Member DB changes:
  - Prospective Cost Neutral Option 4 effective after June 30, 2016
  - Prospective Greater of FAS 3 No OT and FAS 5 for all except State Police with 20 or more years of service effective after December 31, 2016
- Entry Age Normal Cost Method Changes
  - Revised Amortization Period for Decrease in UAL due to Legislated Plan Changes
    - From 10 to 30 Years
  - Reduced Employer Contribution Collar (FY2016-17: 2.25%)

If a different order is used, the cost impact will vary from what is shown above.

SERS Projected Employer Contributions (E Upon Final December 31, 2014 Valuation) Under:  
 Either SB 1082, PN 1460, A04826 Or SB 1082, PN 1460, A05049

Legacy DB Plan With New Provisions, Including New 1.00% Accrual Defined Benefit Tier, Plus New DC Plan (DC/DB) With Er Contrib @ 2.5%, State Police, Correction Officers, and Other Hazardous Duty ONLY Remain in Current DB Plan; No Fresh Start; No Legacy Contribution/Accrual Rate Changes; Traditional Entry Age Normal Cost; Cost of Legislation Amortized Over 30 Years; No Change to Act 120 Collars

Year	Investment Return	Fiscal Year	Floor Contribution	Projected DB Contribution (\$ in millions)	Expected DB Contribution (\$ in millions)	Expected DB Payroll (\$ in millions)	DC/DB Plan FY Payroll (\$ in millions)	DC/DB Contribution (\$ in millions)	Total DB+DC/DB Contribution (\$ in millions)	DB+DC/DB Contribution as a % of DB+DC/DB Pay	Annual (Savings) / Cost Relative to Baseline	Cumulative (Savings) / Cost Relative to Baseline	Funded Ratio (AV%)	UAL (\$ in billions)	Funded Ratio (MW%)	Baseline Percent	Baseline \$ (\$ in millions)
2011	2.70%	2012/2013	5.10%	11.50	5,890.7	677.4	-	677.4	677.4	11.50	-	-	65.3	14.69	57.6	11.50	677.4
2012	12.00%	2013/2014	5.01%	16.00	5,836.4	933.8	-	933.8	933.8	16.00	-	-	58.7	17.78	58.9	16.00	933.8
2013	13.60%	2014/2015	5.00%	20.50	5,897.6	1,209.0	-	1,209.0	1,209.0	20.50	-	-	59.2	17.90	62.4	20.50	1,209.0
2014	6.40%	2015/2016	4.95%	25.00	6,021.7	1,505.4	-	1,505.4	1,505.4	25.00	-	-	59.4	18.17	61.1	25.00	1,505.4
2015	7.50%	2016/2017	9.72%	29.50	6,205.3	1,830.6	-	1,830.6	1,830.6	29.50	-	-	65.4	14.43	67.1	29.50	1,830.6
2016	7.50%	2017/2018	9.57%	29.65	6,277.3	1,884.5	117.3	14.2	1,898.7	29.69	(45.8)	(45.8)	67.2	13.98	67.9	30.41	1,944.5
2017	7.50%	2018/2019	9.34%	28.47	6,233.5	1,842.7	386.1	42.2	1,884.9	28.60	(52.2)	(98.1)	69.1	13.47	69.0	29.40	1,937.1
2018	7.50%	2019/2020	9.11%	27.75	6,173.5	1,827.8	617.1	71.7	1,899.5	27.97	(57.5)	(155.6)	70.1	13.28	70.2	28.82	1,957.0
2019	7.50%	2020/2021	8.90%	26.95	6,130.2	1,808.8	867.5	98.9	1,907.7	27.26	(62.3)	(217.9)	71.3	12.98	71.3	28.15	1,970.0
2020	7.50%	2021/2022	8.70%	26.20	6,088.0	1,791.5	1,123.2	125.8	1,917.3	26.59	(67.1)	(285.0)	72.5	12.88	72.5	27.52	1,984.4
2021	7.50%	2022/2023	8.51%	25.48	6,046.0	1,775.7	1,385.1	152.5	1,928.2	25.95	(72.0)	(357.0)	73.6	12.36	73.6	26.92	2,000.2
2022	7.50%	2023/2024	8.32%	24.79	6,001.4	1,760.5	1,656.4	179.2	1,939.7	25.33	(77.2)	(434.2)	74.7	12.03	74.7	26.34	2,016.9
2023	7.50%	2024/2025	8.13%	24.12	5,953.3	1,745.4	1,998.0	206.1	1,951.5	24.73	(82.5)	(516.7)	75.8	11.67	75.8	25.78	2,034.0
2024	7.50%	2025/2026	7.95%	23.46	5,902.1	1,730.5	2,229.9	233.1	1,963.6	24.15	(88.1)	(604.9)	76.9	11.28	76.9	25.23	2,051.7
2025	7.50%	2026/2027	7.78%	22.83	5,848.6	1,715.9	2,531.4	260.1	1,976.0	23.58	(94.0)	(698.8)	78.0	10.87	78.0	24.70	2,070.0
2026	7.50%	2027/2028	7.61%	22.21	5,794.6	1,701.9	2,841.0	287.1	1,989.0	23.03	(100.0)	(798.8)	79.2	10.42	79.2	24.19	2,089.0
2027	7.50%	2028/2029	7.44%	21.61	5,741.4	1,688.5	3,157.6	314.0	2,002.5	22.50	(106.0)	(904.8)	80.4	9.94	80.4	23.69	2,108.5
2028	7.50%	2029/2030	7.29%	21.04	5,687.3	1,675.5	3,483.1	340.8	2,016.3	21.99	(112.3)	(1,017.1)	81.6	9.43	81.6	23.21	2,128.6
2029	7.50%	2030/2031	7.13%	20.48	5,631.7	1,662.8	3,818.4	367.8	2,030.6	21.49	(118.7)	(1,135.8)	82.9	8.87	82.9	22.74	2,149.3
2030	7.50%	2031/2032	6.98%	19.93	5,574.5	1,650.4	4,163.9	394.9	2,045.3	21.00	(125.4)	(1,261.2)	84.2	8.28	84.2	22.29	2,170.7
2031	7.50%	2032/2033	6.84%	19.41	5,514.5	1,638.2	4,520.9	422.2	2,060.4	20.53	(132.4)	(1,393.6)	85.5	7.64	85.5	21.85	2,192.8
2032	7.50%	2033/2034	6.70%	18.89	5,453.9	1,626.5	4,887.6	449.6	2,076.1	20.08	(139.5)	(1,533.1)	87.0	6.95	87.0	21.42	2,215.6
2033	7.50%	2034/2035	6.57%	18.40	5,395.8	1,615.4	5,261.1	477.0	2,092.4	19.63	(146.6)	(1,679.8)	88.5	6.21	88.5	21.01	2,239.0
2034	7.50%	2035/2036	6.44%	17.92	5,340.5	1,605.0	5,641.4	504.3	2,109.3	19.21	(153.9)	(1,833.7)	90.0	5.41	90.0	20.61	2,263.2
2035	7.50%	2036/2037	6.32%	17.46	5,287.0	1,595.2	6,029.9	531.7	2,126.9	18.79	(161.3)	(1,994.9)	91.7	4.56	91.7	20.22	2,288.2
2036	7.50%	2037/2038	6.20%	17.02	5,233.4	1,585.7	6,428.6	555.4	2,145.1	18.39	(168.9)	(2,163.8)	93.4	3.64	93.4	19.84	2,314.0
2037	7.50%	2038/2039	6.09%	16.58	5,179.3	1,576.5	6,838.4	587.4	2,163.9	18.01	(176.6)	(2,340.4)	95.3	2.65	95.3	19.48	2,340.5
2038	7.50%	2039/2040	5.98%	16.17	5,126.3	1,567.8	7,258.0	615.6	2,183.4	17.63	(184.5)	(2,524.9)	97.2	1.59	97.2	19.12	2,367.9
2039	7.50%	2040/2041	5.88%	12.04	5,075.4	1,085.2	7,686.6	644.1	1,729.3	13.55	(192.5)	(2,717.5)	99.2	0.44	99.2	15.06	1,921.8
2040	7.50%	2041/2042	5.78%	9.06	5,027.9	722.2	8,123.3	672.8	1,395.0	10.61	(200.7)	(2,918.2)	100.5	(0.31)	100.5	12.13	1,595.7
2041	7.50%	2042/2043	5.69%	5.74	4,984.3	290.2	8,568.0	701.7	991.9	7.32	(208.9)	(3,127.1)	101.3	(0.77)	101.3	8.86	1,200.8
2042	7.50%	2043/2044	5.60%	5.60	4,945.7	277.1	9,020.0	731.0	1,008.1	7.22	51.0	(3,076.1)	101.4	(0.83)	101.4	6.85	957.1
2043	7.50%	2044/2045	5.52%	5.52	4,913.7	271.4	9,477.9	765.5	1,031.9	7.17	72.0	(3,004.1)	101.0	(0.62)	101.0	6.67	959.9
2044	7.50%	2045/2046	5.45%	5.45	4,889.4	266.4	9,941.2	796.3	1,056.7	7.12	104.6	(2,899.6)	101.1	(0.66)	101.1	6.42	952.1
2045	7.50%	2046/2047	5.38%	5.38	4,874.9	262.3	10,408.0	820.3	1,082.6	7.08	138.0	(2,761.5)	101.1	(0.68)	101.1	6.18	944.6
2046	7.50%	2047/2048	5.32%	5.32	4,871.5	259.2	10,877.5	850.7	1,109.9	7.05	117.5	(2,644.0)	101.4	(0.87)	101.4	6.30	992.4
2047	7.50%	2048/2049	5.27%	5.27	4,861.5	257.1	11,347.9	881.4	1,138.5	7.01	95.0	(2,551.1)	101.4	(0.94)	101.4	6.44	1,045.5
2048	7.50%	2049/2050	5.22%	5.22	4,907.6	256.2	11,816.8	912.3	1,168.5	6.99	93.0	(2,455.5)	101.5	(1.02)	101.5	6.42	1,072.9
2049	7.50%	2050/2051	5.18%	5.18	4,950.0	256.5	12,284.5	943.6	1,200.1	6.96	91.5	(2,364.0)	101.6	(1.09)	101.6	6.43	1,108.5
2050	7.50%	2051/2052	5.15%	5.15	5,006.8	257.7	12,753.3	975.3	1,233.0	6.94	88.6	(2,275.4)	101.7	(1.17)	101.7	6.44	1,144.4



**Summary Table - For Either SB 1082, A04826 Or SB 1082, A05049  
Using 30-Year Amortization Financing & No Changes to Act 120 Collars  
Pennsylvania State Employees' Retirement System  
Allocation of Potential Projected (Savings)/Cost Through FY 2052  
Due to Side-By-Side Hybrid Design, Including Changes to Current DB  
(Amounts in millions)**

**Benefit Changes**

Amendment - 1.00% DB Accrual (Ee 3.00%) for most hires after December 31, 2017	\$ (2,672.3)
Amendment - DC Plan (Ee 3.25%; Er 2.5%) for most hires after December 31, 2017	\$ 4,986.4
Amendment - Prospective Cost Neutral Option 4 for Pre-Act 120 Members	\$ (358.4)
Amendment - Greater of FAS 3 with No OT and FAS 5 on Future DB Accruals for Current DB Members Other Than State Police with 20 or more years of service; FAS 5 for Hybrid DB Members	<u>\$ (1,301.4)</u>
Sub-total Benefit Changes	\$ 654.3

**Total Hybrid Plan and Current DB Changes: (Savings)/Cost through FY 2052 without Financing Changes**

\$ 654.3

**Financing Changes**

New Entry Age Normal Cost Approach	\$ 516.7
Revised Amortization Period for Plan Changes From 10 to 30 Years	\$ (3,446.4)
Sub-total Financing Changes	\$ (2,929.7)

**Total Hybrid Plan and Current DB Changes: (Savings)/Cost through FY 2052 with Both Benefit and Financing Changes**

\$ (2,275.4)

**Notes:**

The potential (savings)/cost was valued in the following order:

1.00% accrual DB design generally effective after December 31, 2017

- State Police and most other hazardous duty employees exempt from both new DB and DC plans
- DB employee contribution rate: 3.00%
- Elected Officials: Includes change to lower accrual upon election/reelection: under SB 1082, A04826, current Elected Officials would have one-time opportunity to opt in to their current membership class upon post-2017 reelection; under SB 1082, A05049, no such opportunity would be available
- Does not include impact of changes to FAS 5 in Hybrid DB until later FAS step

DC Plan (Ee 3.25%; Er 2.5%) generally effective after December 31, 2017

- State Police and most other hazardous duty employees exempt from both new DB and DC plans

Current Member DB changes:

- Prospective Cost Neutral Option 4 effective after June 30, 2016
- Prospective Greater of FAS 3 No OT and FAS 5 for all except State Police with 20 or more years of service effective after December 31, 2016

Entry Age Normal Cost Method Changes

Revised Amortization Period for Decrease in UAL due to Legislated Plan Changes

- From 10 Years to 30 Years

If a different order is used, the cost impact will vary from what is shown above.