



Cavanaugh Macdonald
CONSULTING, LLC

The experience and dedication you deserve



**Report on the Annual Valuation of the
State Police Retirement System**

Prepared as of June 30, 2015





Cavanaugh Macdonald

CONSULTING, LLC

The experience and dedication you deserve

November 10, 2015

Board of Trustees
Kentucky Retirement Systems
Perimeter Park West
1260 Louisville Road
Frankfort, KY 40601

Dear Members of the Board:

Presented in this report are the results of the annual actuarial valuation of the retirement and insurance benefits provided under the State Police Retirement System (SPRS). The purpose of the valuation was to measure the System's funding progress and to determine the required employer contribution rates for the fiscal years beginning July 1, 2016 and July 1, 2017. The date of the valuation was June 30, 2015.

The valuation was based upon data, furnished by the Executive Director and the Kentucky Retirement Systems (KRS) staff, concerning active, inactive and retired members along with pertinent financial information. The complete cooperation of the KRS staff in furnishing materials requested is hereby acknowledged with appreciation.

Since the previous valuation, the revised assumptions from the economic and demographic experience investigation covering the five-year period from July 1, 2008 to June 30, 2013 have been reflected in this valuation.

To the best of our knowledge, this report is complete and accurate. The valuation was performed by, and under the supervision of, independent actuaries who are members of the American Academy of Actuaries with experience in performing valuations for public retirement systems. The undersigned are members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein. The valuation was prepared in accordance with the principles of practice prescribed by the Actuarial Standards Board.

Future actuarial results may differ significantly from the current results presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law. Since the potential impact of such factors is outside the scope of a normal annual actuarial valuation, an analysis of the range of results is not presented herein.

3550 Busbee Pkwy, Suite 250, Kennesaw, GA 30144

Phone (678) 388-1700 • Fax (678) 388-1730

www.CavMacConsulting.com

Offices in Englewood, CO • Kennesaw, GA • Bellevue, NE



The actuarial calculations were performed by qualified actuaries according to generally accepted actuarial procedures and methods. The calculations are based on the current provisions of the system, and on actuarial assumptions that are, in the aggregate, internally consistent and reasonably based on the actual experience of the system.

Respectfully submitted,

A handwritten signature in cursive script that reads "Todd B. Green".

Todd B. Green ASA, FCA, MAAA
Principal and Consulting Actuary

A handwritten signature in cursive script that reads "Alisa Bennett".

Alisa Bennett, FSA, EA, FCA, MAAA
Principal and Consulting Actuary

TBG/AB:kc



TABLE OF CONTENTS

<u>Section</u>	<u>Item</u>	<u>Page No.</u>
I	Summary of Principal Results	1
II	Membership Data	5
III	Assets	6
IV	Comments on Valuation	7
V	Derivation of Experience Gains and Losses	9
VI	Actuarially Determined Contribution Rates	12
VII	Accounting Information	14
<u>Schedule</u>		
A	Valuation Balance Sheet and Solvency Test	18
B	Development of Actuarial Value of Assets	21
C	Statement of Actuarial Assumptions and Methods	23
D	Summary of Main Benefit and Contribution Provisions	30
E	Detailed Tabulations of the Data	37
F	Sensitivity Analysis	42



**REPORT ON THE ANNUAL VALUATION OF THE
STATE POLICE RETIREMENT SYSTEM**

PREPARED AS OF JUNE 30, 2015

SECTION I – SUMMARY OF PRINCIPAL RESULTS

This report, prepared as of June 30, 2015, presents the results of the annual actuarial valuation of the retirement and insurance benefits provided under the System. For convenience of reference, the principal results of the valuation and a comparison with the preceding year's results are summarized in the following table.

SUMMARY OF PRINCIPAL RESULTS

	6/30/2015	6/30/2014
Contributions for next fiscal year:		
Retirement	66.47%	58.44%
Insurance	<u>18.87</u>	<u>19.17</u>
Total	85.34%	77.61%
Funded status as of valuation date:		
Retirement		
Actuarial accrued liability	\$734,156,446	\$681,118,402
Actuarial value of assets	248,387,946	242,741,735
Unfunded liability on actuarial value of assets	485,768,500	438,376,667
Funded ratio on actuarial value of assets	33.83%	35.64%
Market value of assets	\$246,968,144	\$260,763,486
Unfunded liability on market value of assets	487,188,302	420,354,916
Funded ratio on market value of assets	33.64%	38.28%
Insurance		
Actuarial accrued liability	\$254,838,710	\$234,271,127
Actuarial value of assets	167,774,940	155,594,760
Unfunded liability on actuarial value of assets	87,063,770	78,676,367
Funded ratio on actuarial value of assets	65.84%	66.42%
Market value of assets	\$165,018,209	\$165,167,805
Unfunded liability on market value of assets	89,820,501	69,103,322
Funded ratio on market value of assets	64.75%	70.50%
Demographic data as of valuation date:		
Number of retired participants and beneficiaries	1,460	1,413
Number of vested former members	63	59
Number of former members due a refund	362	349
Number of active members	937	855
Total salary	\$45,764,515	\$44,615,885
Average salary	\$48,842	\$52,182



The State Police Retirement System is a defined benefit pension fund that provides pensions and health care coverage for uniformed state police officers. This report presents the results of the June 30, 2015 actuarial funding valuation for both the Retirement Plan and the Insurance Fund. The primary purpose of performing the actuarial funding valuations are to:

- Calculate the actuarially determined contribution rates for the fiscal years beginning July 1, 2016 and July 1, 2017 for both the Retirement Plan and the Insurance Fund.
- Determine the experience of the System since the last valuation date.
- Disclose asset and liability measures as of the valuation date.
- Analyze and report on trends in contributions, assets, and liabilities over the past several years.

Since the previous valuation there were no changes to the plan provisions, however the actuarial methods and assumptions were updated to reflect an experience study performed over the five-year period ending June 30, 2013 dated April 30, 2014. This experience study was adopted by the Board on December 4, 2014. The experience study reviewed the actuarial assumptions and methods used in the actuarial valuation process of both the Retirement Plan and Insurance Fund. For the Retirement Plan the assumptions fall into three categories. The first are economic assumptions which include price inflation, wage inflation and investment return. The second category includes demographic assumptions which includes assumed rates of mortality, service retirement, disability retirement, withdrawal and salary increases for merits and promotions. For the Insurance Fund the assumptions fall into three categories. The first two, economic assumptions and demographic assumptions are the same as those used for the Retirement Plan. The third category includes other post-employment benefit assumptions.

As a result of the experience the following assumptions were updated:

Summary of Assumptions Changes	
Economic Assumptions	
Salary	Composed of Inflation component, Real Rate of Salary Increase component and Merit/Promotion Scale
Inflation	Reduction to annual assumed rate of inflation assumption from 3.50% to 3.25%.
Wage Inflation	Reduction to annual assumed rate from real salary increase assumption from 1.00% to 0.75%
Investment Rate of Return	Composed of Inflation component (3.25% from above) and Real Rate of Return component. Reduction from 7.75% to 7.50% net investment return assumption.
Payroll Growth	Reduce from 4.50% to 4.00%.



Summary of Assumptions Changes	
Demographic Assumptions	
Withdrawal	Increase rates of withdrawal
Retirement	Adjusted rates of retirement
Base Mortality	Healthy Retirees – RP-2000 Mortality Tables Set back one year for females. Disabled Retirees – RP-2000 Combined Disabled Mortality Tables for disabled annuitants set back four years for males. Actives – 50% of the RP-2000 Combined Mortality for males, 30% of the RP-2000 Combined Mortality for females.
Mortality Projection	Healthy Retiree and Beneficiary – Mortality rates are projected to 2013 using improvement Scale BB Disable Retirees – Mortality rates are projected to 2013 using improvement Scale BB Active Members – Mortality rates are projected to 2013 using improvement Scale BB

The actuarial valuation results provide “snapshot” view the System’s financial condition on June 30, 2015. Actuarial gains and losses result when actuarial experience of the plan (such as asset return, pay increases, turnover, deaths, etc.) is different from the expected by the actuarial assumptions. The Retirement Plan’s Unfunded Actuarial Accrued Liability (UAAL) was expected to be \$440.8 million taking into account contributions from both the employer and members of \$37.8 million. The actual UAAL was \$485.8 million. The increase of \$45 million was due to the change in actuarial assumptions and methods and an actuarial loss due to actual experience different than what was anticipated by the assumptions. The Insurance Funds UAAL was expected to be \$80.5 million taking into account expected employer and member contributions of \$8.5 million. The actual UAAL was \$87.1 million. The increase in the UAAL of \$6.6 million was due to the change in actuarial assumptions and methods offset by an actuarial gain due to actuarial experience different than what was anticipated by the assumptions.

The remaining amortization period of the UAAL of both the Pension and Insurance Funds is 28-years as of June 30, 2015. Detailed analysis of the gains and losses are presented in Section V of the report.

As of June 30, 2015 the Pension and Insurance Funds had net assets of \$246,968,144 and \$165,018,209 respectively. The market value of assets is not used directly in the calculation of the unfunded actuarial accrued liability and the actuarially determined contribution. The asset valuation method which recognizes the annual unexpected portion of market value investment returns over a five-year period, attempts to dampen the effect of market volatility. The resulting amount is called the “actuarial value of assets” and is utilized to determine the actuarial valuation results. In this year’s actuarial valuation, the actuarial value of assets as of June 30, 2015 was \$248,387,946 and \$167,774,940 respectively for the Pension and Insurance Funds.



On a market basis, the estimated rate of return was 1.36% and 1.78% respectively for the Pension and Insurance Funds, assuming all cash flows occur in the middle of the year. Due to better than assumed prior returns on the market value of assets the net rate of return measured on the actuarial value of assets was 9.76% and 9.90% respectively for both the Pension and Insurance Funds. Please see Section III and Schedule B of this report for more detailed information on the market and actuarial value of assets.

Schedule F provides sensitivity analysis for three different sets of economic assumptions; the discount rate assumption, the inflation assumption, and the payroll growth assumption. Two assumption change scenarios are presented for each economic assumption. The results of the economic assumption change scenarios are presented along with the valuation results for comparison.

The long-term financial health of this retirement System, like all retirement systems, is heavily dependent on two key items: (1) future investment returns and (2) contributions to the System. The System has recently been strengthened due to two reasons. They are: recent legislative action that provides 100% funding of the actuarially determined contribution and the elimination of unfunded ad hoc cost-of-living adjustments for retirees. The cost for providing cost-of-living adjustments for retirees must be prefunded in advance.



SECTION II – MEMBERSHIP DATA

Data regarding the membership of the System for use as a basis for the valuation were furnished by the System's office. The following tables summarize the membership of the system as of June 30, 2015 upon which the valuation was based. Detailed tabulations of the data are given in Schedule E.

Active Members

Number	Payroll	Group Averages		
		Salary	Age	Service
937	\$45,764,515	\$48,842	36.8	9.8

The following table shows a six-year history of active member valuation data.

SCHEDULE OF SPRS ACTIVE MEMBER VALUATION DATA

Valuation Date	Number	Annual Payroll	Annual Average Pay	% Increase in Average Pay
6/30/2010	961	\$51,506,712	\$53,597	(1.9)%
6/30/2011	965	48,692,616	50,459	(5.9)
6/30/2012	907	48,372,506	53,332	5.7
6/30/2013	902	45,256,202	50,173	(5.9)
6/30/2014	855	44,615,885	52,182	4.0
6/30/2015	937	45,764,515	48,842	(6.4)

The following table shows the number and annual retirement allowances payable to retired members and their beneficiaries on the roll of the Retirement System as of the valuation date as well as certain group averages.

Retired Lives

Type of Benefit Payment	Number	Annual Benefits	Group Averages	
			Benefit	Age
Retiree	1,222	\$49,027,447	\$40,121	61.9
Disability	52	\$934,883	17,979	57.6
Beneficiary	186	4,968,091	26,710	64.8
Total in SPRS	1,460	\$54,930,421	\$37,624	62.1

This valuation also includes 425 inactive members of which 63 are vested.



SECTION III - ASSETS

1. As of June 30, 2015 the total market value of assets amounted to \$411,986,353 as shown in the following table. The Insurance assets include both the amount in the health care trust and the amount in the 401(h) account in the pension trust established to meet the requirements of HB1.

Retirement	Insurance	SPRS Total
\$246,968,144	\$165,018,209	\$411,986,353

2. The five-year smoothed market related actuarial value of assets used for the current valuation was \$416,162,886. Schedule B shows the development of the actuarial value of assets as of June 30, 2015. The following table shows the actuarial value of assets.

COMPARISON OF ACTUARIAL VALUE OF ASSETS

	JUNE 30, 2015	JUNE 30, 2014
Retirement	\$ 248,387,946	\$ 242,741,735
Insurance	<u>167,774,940</u>	<u>155,594,760</u>
Total	\$ 416,162,886	\$ 398,336,495



SECTION IV - COMMENTS ON VALUATION

Schedule A of this report contains the valuation balance sheets which show the present and prospective assets and liabilities of the System as of June 30, 2015. Separate balance sheets are shown for Retirement and Insurance. Since the previous valuation, the revised assumptions from the economic and demographic experience investigation covering the five-year period from July 1, 2008 to June 30, 2013 have been reflected in this valuation.

Retirement

1. The total valuation balance sheet on account of retirement benefits shows that the System has total prospective retirement benefit liabilities of \$798,031,279, of which \$601,295,055 is for the prospective benefits payable on account of present retired members and beneficiaries of deceased members, \$4,559,850 is for the prospective benefits payable on account of inactive members, \$192,176,374 is for the prospective benefits payable on account of present active members. Against these retirement benefit liabilities the System has a total present actuarial value of assets of \$248,387,946 as of June 30, 2015. The difference of \$549,643,333 between the total liabilities and the total present actuarial value of assets represents the present value of contributions to be made in the future on account of retirement benefits. Of this amount, \$32,949,643 is the present value of future contributions expected to be made by members, and the balance of \$516,693,690 represents the present value of future contributions payable by the State.
2. The State's contributions to the System on account of retirement benefits consist of normal contributions, accrued liability contributions and contributions for administrative expenses. The valuation indicates that employer normal contributions at the rate of 8.35% of payroll are required to fund the continuing benefit accruals for the average active member of SPRS.
3. Prospective employer normal contributions on account of retirement benefits at the above rates have a present value of \$30,925,190. When this amount is subtracted from \$516,693,690, which is the present value of the total future contributions to be made by the State, there remains \$485,768,500 as the amount of future accrued liability contributions.
4. It is recommended that the accrued liability contribution rate payable by the State on account of retirement benefits be set at 57.70% of payroll. This rate is sufficient to liquidate the unfunded accrued liability of \$485,768,500 over 28 years on the assumption that the aggregate payroll for members will increase by 4.00% each year.
5. The contribution rate for administrative expenses is determined to be 0.42% of payroll.



Insurance

1. The total valuation balance sheet on account of insurance benefits shows that the System has total prospective insurance benefit liabilities of \$280,995,978, of which \$165,675,982 is for the prospective benefits payable on account of present retired members and beneficiaries of deceased members, \$4,771,225 is for the prospective benefits payable on account of inactive members, and \$110,548,771 is for the prospective benefits payable on account of present active members. Against these insurance benefit liabilities the System has a total present actuarial value of assets of \$167,774,940 as of June 30, 2015. The difference of \$113,221,038 between the total liabilities and the total present actuarial value of assets represents the present value of contributions to be made in the future on account of insurance benefits. Of this amount, \$1,558,766 is the present value of future contributions expected to be made by members, and the balance of \$111,662,272 represents the present value of future contributions payable by the State.
2. The State's contributions to the System on account of insurance benefits consist of normal contributions and accrued liability contributions. The valuation indicates that employer normal contributions at the rate of 8.48% of payroll are required to fund the continuing benefit accruals for the average active member of SPRS.
3. Prospective employer normal contributions on account of insurance benefits at the above rates have a present value of \$24,598,502. When this amount is subtracted from \$111,662,272, which is the present value of the total future contributions to be made by the employers, there remains \$87,063,770 as the amount of future accrued liability contributions.
4. It is recommended that the accrued liability contribution rate payable by the State on account of insurance benefits be set at 10.25% of payroll. This rate is sufficient to liquidate the unfunded accrued liability of \$87,063,770 over 28 years on the assumption that the aggregate payroll for members will increase by 4.00% each year.
5. The contribution rate for administrative expenses is determined to be 0.14% of payroll.



SECTION V – DERIVATION OF EXPERIENCE GAINS AND LOSSES

Actual experience will never (except by coincidence) coincide exactly with assumed experience. It is assumed that gains and losses will be in balance over a period of years, but sizable year to year fluctuations are common. Detail on the derivation of the experience gain (loss) for the year ended June 30, 2015 is shown below (\$ millions).

**Experience Gain/(Loss)
Retirement Benefits**

		Amount	
(1)	UAAL* as of 6/30/14	\$	438.4
(2)	Normal cost from last valuation		7.1
(3)	Contributions		37.8
(4)	Interest accrual: [(1) + (2)] x .0775 - (3) x .03875		33.1
(5)	Expected UAAL before changes: (1) + (2) - (3) + (4)	\$	440.8
(6)	Change due to Actuarial Audit		0.0
(7)	Change due to new actuarial assumption or methods		(40.2)
(8)	Expected UAAL after changes: (5) - (6) - (7)	\$	481.0
(9)	Actual UAAL as of 6/30/15	\$	485.8
(10)	Gain/(loss): (8) - (9)	\$	(4.8)
(11)	Accrued liabilities as of 6/30/14	\$	681.1
(12)	Gain/(loss) as percent of actuarial accrued liabilities at start of year		(0.7)%

**Unfunded actuarial accrued liability*



**Experience Gain/(Loss)
Insurance Benefits**

		Amount	
(1)	UAAL* as of 6/30/14	\$	78.7
(2)	Normal cost from last valuation		4.5
(3)	Expected contributions		<u>8.5</u>
(4)	Interest accrual: [(1) + (2) - (3)] x .0775		5.8
(5)	Expected UAAL before changes: (1) + (2) - (3) + (4)	\$	80.5
(6)	Change due to Actuarial Audit		(0.1)
(7)	Change due to new actuarial assumption or methods		(8.5)
(8)	Expected UAAL after changes: (5) - (6) - (7)	\$	89.1
(9)	Actual UAAL as of 6/30/15	\$	87.1
(10)	Gain/(loss): (8) - (9)	\$	2.0
(11)	Accrued liabilities as of 6/30/14	\$	234.3
(12)	Gain/(loss) as percent of actuarial accrued liabilities at start of year		0.9%

* *Unfunded Actuarial Accrued Liability*



**SPRS MEMBERS
ANALYSIS OF FINANCIAL EXPERIENCE
Gains & Losses in Accrued Liabilities
Resulting from Difference Between
Assumed Experience & Actual Experience
(\$ Millions)**

Type of Activity	Retirement \$ Gain (or Loss) For Year Ending 6/30/15	Insurance \$ Gain (or Loss) For Year Ending 6/30/15
Age & Service Retirements. If members retire at older ages, there is a gain. If younger ages, a loss.	\$ (6.5)	\$ (13.0)
Disability Retirements. If disability claims are less than assumed, there is a gain. If more claims, a loss.	0.0	0.1
Death-in Service Benefits. If survivor claims are less than assumed, there is a gain. If more claims, there is a loss.	0.0	(0.1)
Withdrawal From Employment. If more liabilities are released by withdrawals than assumed, there is a gain. If smaller releases, a loss.	(0.7)	(0.2)
Pay or Claims Increases. If there are smaller pay increases than assumed, there is a gain. If greater increases, a loss. For insurance, smaller claims increases than assumed creates a gain; larger, a loss.	2.2	12.1
New Members. Additional unfunded accrued liability will produce a loss.	(0.4)	(0.1)
Investment Income. If there is a greater investment income than assumed, there is a gain. If less income, a loss.	5.2	3.3
Death or Waiver After Retirement. If retired members live longer than assumed, there is a loss. If not as long, a gain. If retired members receiving health benefits later waive coverage, there is a gain.	(1.7)	1.5
Other. Miscellaneous gains and losses resulting from changes in valuation software, data adjustments, timing of financial transactions, insurance election changes, etc.	<u>(2.9)</u>	<u>(1.6)</u>
Gain (or Loss) During Year From Financial Experience	\$ (4.8)	\$ 2.0
Non-Recurring Items. Adjustments for plan amendments, assumption changes, method changes and data corrections	<u>(40.2)</u>	<u>(8.6)</u>
Composite Gain (or Loss) During Year	\$ (45.0)	\$ (6.6)



SECTION VI – ACTUARIALLY DETERMINED CONTRIBUTION RATES

The valuation balance sheet gives the basis for determining the percentage rates for contributions to be made by the State to the Retirement System. The following tables show the rates of contribution payable by employers as determined from the present valuation. This rate is for informational purposes only.

Actuarially Determined Contribution Rates

Retirement

Contribution Rate for	% of Payroll
A. Normal Cost:	
(1) Service retirement benefits	15.07%
(2) Disability benefits	0.52
(3) Survivor benefits	0.13
(4) Total	<u>16.35%</u>
B. Member Contributions	8.00%
C. Employer Normal Cost: [A(4) - B]	8.35%
D. Administrative Expenses	0.42%
E. Unfunded Actuarial Accrued Liability Contributions:	
(1) UAAL Contribution Rate as of 6/30/14 Valuation:	50.05%
(2) Change due to:	
a. Active decrements	0.86%
b. Pay increases	(0.26)%
c. Retiree mortality	0.20%
d. Investment return	(0.61)%
e. Assumption Changes	4.77%
f. Payroll Growth Assumption	2.23%
g. Other	0.46%
h. Total Change	<u>7.65%</u>
(3) UAAL Contribution Rate as of 6/30/15 Valuation: [E(1) +E(2)h]	57.70%
F. Total Recommended Employer Contribution Rate: [C+D+E(3)]	66.47%

* Based on 28 year amortization of the UAAL from June 30, 2015



Actuarially Determined Contribution Rates

Insurance

Contribution Rate for	% of Payroll
A. Normal Cost	8.72%
B. Member Contributions*	0.24%
C. Employer Normal Cost: [A - B]	8.48%
D. Administrative Expenses	0.14%
E. Unfunded Actuarial Accrued Liability**	10.25%
F. Total Recommended Employer Contribution Rate: [C+D+E]	18.87%

**The liabilities are net of retiree contributions toward their healthcare.*

*** Based on 28 year amortization of the UAAL from June 30, 2015*



SECTION VII - ACCOUNTING INFORMATION

Governmental Accounting Standards Board Statements (GASB) 43, 45, 67 and 68 set forth certain items of required supplementary information to be disclosed in the financial statements of the System and the employer. The information required under GASB 67 and 68 will be issued in separate reports. We are providing the retirement benefit information for informational purposes only. One such item is a distribution of the number of employees by type of membership, as follows:

**NUMBER OF ACTIVE AND RETIRED MEMBERS
AS OF JUNE 30, 2015**

GROUP	NUMBER
Retirees and beneficiaries currently receiving benefits	1,460
Terminated employees entitled to benefits but not yet receiving benefits	425
Active Members	<u>937</u>
Total	2,822

Another such item is the Schedule of Funding Progress for retirement and insurance benefits separately as shown in the following tables.



**RETIREMENT BENEFITS
SCHEDULE OF FUNDING PROGRESS**

Actuarial Valuation Date	Value of Plan Assets (a)	Actuarial Liability (AAL) Entry Age (b)	Unfunded AAL (UAAL) (b - a)	Funded Ratio (a / b)	Covered Payroll (c)	UAAL as a Percentage of Covered Payroll ((b - a) / (c))
6/30/2010	\$ 304,577,292	\$ 612,444,806	\$ 307,867,514	49.7%	\$ 51,506,712	597.7%
6/30/2011	285,580,631	634,379,401	348,798,770	45.0	48,692,616	716.3
6/30/2012	259,791,575	647,688,665	387,897,090	40.1	48,372,506	801.9
6/30/2013	241,800,328	651,580,654	409,780,326	37.1	45,256,202	905.5
6/30/2014	242,741,735	681,118,402	438,376,667	35.6	44,615,885	982.6
6/30/2015*	248,387,946	734,156,446	485,768,500	33.8	45,764,515	1,061.5

* Discount rate changed from 7.75% to 7.50%

**INSURANCE BENEFITS
SCHEDULE OF FUNDING PROGRESS**

Actuarial Valuation Date	Value of Plan Assets (a)	Actuarial Liability (AAL) Entry Age (b)	Unfunded AAL (UAAL) (b - a)	Funded Ratio (a / b)	Covered Payroll (c)	UAAL as a Percentage of Covered Payroll ((b - a) / (c))
6/30/2010	\$ 121,175,083	\$ 434,960,495	\$ 313,785,412	27.9%	\$ 51,506,712	609.2%
6/30/2011	123,687,289	438,427,763	314,740,474	28.2	48,692,616	646.4
6/30/2012	124,372,072	333,903,782	209,531,710	37.2	48,372,506	433.2
6/30/2013*	136,321,060	222,326,743	86,005,683	61.3	45,256,202	190.0
6/30/2014	155,594,760	234,271,127	78,676,367	66.4	44,615,885	176.3
6/30/2015**	167,774,940	254,838,710	87,063,770	65.8	45,764,515	190.2

* Discount rate changed from 4.50% to 7.75%

** Discount rate changed from 7.75% to 7.50%



**INSURANCE BENEFITS
SCHEDULE OF EMPLOYER CONTRIBUTIONS**

Year Ended	Annual Required Contribution	Retiree Drug Subsidy (RDS) Contribution	Employer Contributions	Total Contributions	Percentage Contributed
June 30, 2010	\$30,302,151	\$273,684	\$ 8,369,428	\$ 8,643,112	28.5%
June 30, 2011	25,772,574	0	11,050,964	11,050,964	42.9
June 30, 2012	28,246,786	0	11,960,468	11,960,468	42.3
June 30, 2013	27,234,229	0	16,828,681	16,828,681	61.8
June 30, 2014	20,879,022	0	14,493,242	14,493,242	69.4
June 30, 2015	9,889,797	0	10,381,881	10,381,881	105.0



The information presented in the required supplementary schedules was determined as part of the actuarial valuation at June 30, 2015. Additional information as of the latest actuarial valuation follows.

Insurance Benefits	
Valuation date	6/30/2015
Actuarial cost method	Entry Age
Amortization	Level Percent Closed
Remaining amortization period	28 years
Asset valuation method	5 Year Smoothed Market
Medical Trend Assumption (Pre-Medicare)	7.50% - 5.00%
Medical Trend Assumption (Post-Medicare)	5.50% - 5.00%
Year of Ultimate Trend	2020
Dollar Contribution Trend	1.50%
Actuarial assumptions:	
Investment rate of return*	7.50%
*Includes price inflation at	3.25%



SCHEDULE A

Valuation Balance Sheet and Solvency Test

The following valuation balance sheets show the assets and liabilities of the retirement system as of the current valuation date of June 30, 2015 and, for comparison purposes, as of the immediately preceding valuation date of June 30, 2014. The items shown in the balance sheet are present values actuarially determined as of the relevant valuation date.

**VALUATION BALANCE SHEETS
SHOWING THE ASSETS AND LIABILITIES OF THE
STATE POLICE RETIREMENT SYSTEM**

RETIREMENT BENEFITS

	JUNE 30, 2015	JUNE 30, 2014
ASSETS		
Current actuarial value of assets	\$ 248,387,946	\$ 242,741,735
Prospective contributions		
Member contributions	\$ 32,949,643	\$ 32,424,439
Employer normal contributions	30,925,190	31,007,228
Unfunded accrued liability contributions	485,768,500	438,376,667
Total prospective contributions	<u>\$ 549,643,333</u>	<u>\$ 501,808,334</u>
Total assets	<u>\$ 798,031,279</u>	<u>\$ 744,550,069</u>
LIABILITIES		
Present value of benefits payable on account of present retired members and beneficiaries	\$ 601,295,055	\$ 559,105,744
Present value of benefits payable on account of active members	192,176,374	181,539,042
Present value of benefits payable on account of inactive members	<u>4,559,850</u>	<u>3,905,282</u>
Total liabilities	<u>\$ 798,031,279</u>	<u>\$ 744,550,068</u>



**VALUATION BALANCE SHEET
INSURANCE BENEFITS**

	JUNE 30, 2015	JUNE 30, 2014
ASSETS		
Current actuarial value of assets	\$ 167,774,940	\$ 155,594,760
Prospective contributions		
Member contributions	\$ 1,558,766	\$ 1,054,241
Employer normal contributions	24,598,502	32,863,440
Unfunded accrued liability contributions	<u>87,063,770</u>	<u>78,676,367</u>
Total prospective contributions	<u>\$ 113,221,038</u>	<u>\$ 112,594,048</u>
 Total assets	 <u>\$ 280,995,978</u>	 <u>\$ 268,188,808</u>
LIABILITIES		
Present value of benefits payable on account of present retired members and beneficiaries	\$ 165,675,982	\$ 139,228,358
 Present value of benefits payable on account of active members	 110,548,771	 124,786,682
 Present value of benefits payable on account of inactive members	 <u>4,771,225</u>	 <u>4,173,768</u>
 Total liabilities	 <u>\$ 280,995,978</u>	 <u>\$ 268,188,808</u>



The following tables provide the solvency test for SPRS members.

**Solvency Test
Retirement Benefits**

Valuation Date	Aggregate Accrued Liabilities For				Portion of Accrued Liabilities Covered by Reported Asset		
	(1)	(2)	(3)	Actuarial Value of Assets	(1)	(2)	(3)
	Active Member Contributions	Retired Members & Beneficiaries	Active Members (Employer Financed Portion)				
6/30/2010	\$ 42,011,523	\$ 475,892,659	\$ 94,540,624	\$ 304,577,292	100.0%	55.2%	0.0%
6/30/2011	43,574,097	499,194,229	91,611,075	285,580,631	100.0	48.5	0.0
6/30/2012	41,139,306	523,016,647	83,532,712	259,791,575	100.0	41.8	0.0
6/30/2013	39,788,421	535,720,195	76,072,038	241,800,328	100.0	37.7	0.0
6/30/2014	41,831,465	563,011,026	76,275,911	242,741,735	100.0	35.7	0.0
6/30/2015	41,567,127	605,854,905	86,734,414	248,387,946	100.0	34.1	0.0

**Solvency Test
Insurance Benefits**

Valuation Date	Aggregate Accrued Liabilities For				Portion of Accrued Liabilities Covered by Reported Asset		
	(1)	(2)	(3)	Actuarial Value of Assets	(1)	(2)	(3)
	Active Member Contributions	Retired Members & Beneficiaries	Active Members (Employer Financed Portion)				
6/30/2010	\$ 0	\$ 253,580,827	\$ 181,379,668	\$ 121,175,083	100.0%	47.8%	0.0%
6/30/2011	0	252,439,726	185,988,037	123,687,289	100.0	49.0	0.0
6/30/2012	0	190,258,729	143,645,053	124,372,072	100.0	65.4	0.0
6/30/2013	0	139,508,590	82,818,153	136,321,060	100.0	97.7	0.0
6/30/2014	0	143,402,126	90,869,001	155,594,760	100.0	100.0	13.4
6/30/2015	0	170,447,207	84,391,503	167,774,940	100.0	98.4	0.0



SCHEDULE B
Development of Actuarial Value of Assets
Retirement Benefits

Valuation date June 30:	2014	2015	2016	2017	2018	2019
A. Actuarial Value Beginning of Year	\$ 241,800,328	\$ 242,741,735				
B. Market Value End of Year	260,763,486	246,968,144				
C. Market Value Beginning of Year	248,559,040	260,763,486				
D. Cash Flow						
D1. Contributions	25,284,602	37,836,413				
D2. Benefit Payments	(53,239,125)	(54,850,254)				
D3. Administrative Expenses	(214,963)	(201,108)				
D4. Investment Expenses	(1,020,182)	(1,681,302)				
D5. Net	(29,189,658)	(18,896,251)				
E. Investment Income						
E1. Market Total: B.-C.-D5.	41,394,104	5,100,909				
E2. Assumed Rate	7.75%	7.75%				
E3. Amount for Immediate Recognition	19,191,940	21,223,393				
E4. Amount for Phased-In Recognition	22,202,164	(16,122,484)				
F. Phased-In Recognition of Investment Income						
F1. Current Year: 0.20*E4.	4,440,433	(3,224,497)	0	0	0	0
F2. First Prior Year	983,544	4,440,433	(3,224,497)	0	0	0
F3. Second Prior Year	(3,810,203)	983,544	4,440,433	(3,224,497)	0	0
F4. Third Prior Year	4,929,792	(3,810,203)	983,544	4,440,433	(3,224,497)	0
F5. Fourth Prior Year	4,395,559	4,929,792	(3,810,203)	983,544	4,440,433	(3,224,497)
F6. Total Recognized Investment Gain	10,939,125	3,319,069	(1,610,723)	2,199,480	1,215,936	(3,224,497)
G. Actuarial Value End of Year:						
A.+D5.+E3.+F6.	\$ 242,741,735	\$ 248,387,946				
H. Difference Between Market & Actuarial Values	\$ 18,021,751	\$ (1,419,802)	\$ 190,921	\$ (2,008,559)	\$ (3,224,497)	\$ 0

The Actuarial Valuation of Assets recognizes assumed investment income (line E3) fully each year. Differences between actual and assumed investment income (line E4) are phased in over a closed 5 year period. During periods when investment performance exceeds the assumed rate, Actuarial Value of Assets will tend to be less than market value. During periods when investment performance is less than the assumed rate, Actuarial Value of Assets will tend to be greater than market value. If assumed rates are exactly realized for 4 consecutive years, actuarial value will become equal to market value.



**Development of Actuarial Value of Assets
Insurance Benefits**

Valuation date June 30:	2014	2015	2016	2017	2018	2019
A. Actuarial Value Beginning of Year	\$ 136,321,060	\$ 155,594,760				
B. Market Value End of Year	165,167,805	165,018,209				
C. Market Value Beginning of Year	142,830,916	165,167,805				
D. Cash Flow						
D1. Contributions	14,574,060	10,476,944				
D2. Benefit Payments	(12,687,531)	(13,482,044)				
D3. Administrative Expenses	(57,433)	(64,526)				
D4. Investment Expenses	(647,239)	(1,185,520)				
D5. Net	1,181,857	(4,255,146)				
E. Investment Income						
E1. Market Total: B.-C.+D5.	21,155,032	4,105,550				
E2. Assumed Rate	7.75%	0.00%				
E3. Amount for Immediate Recognition	11,787,512	13,867,077				
E4. Amount for Phased-In Recognition	9,367,520	(9,761,527)				
F. Phased-In Recognition of Investment Income						
F1. Current Year: 0.20*E4.	1,873,504	(1,952,305)	0	0	0	0
F2. First Prior Year	603,078	1,873,504	(1,952,305)	0	0	0
F3. Second Prior Year	(1,774,183)	603,078	1,873,504	(1,952,305)	0	0
F4. Third Prior Year	3,818,155	(1,774,183)	603,078	1,873,504	(1,952,305)	0
F5. Fourth Prior Year	1,783,777	3,818,155	(1,774,183)	603,078	1,873,504	(1,952,305)
F6. Total Recognized Investment Gain	6,304,331	2,568,249	(1,249,906)	524,277	(78,801)	(1,952,305)
G. Actuarial Value End of Year:						
A.+D5.+E3.+F6.	\$ 155,594,760	\$ 167,774,940				
H. Difference Between Market & Actuarial Values	\$ 9,573,045	\$ (2,756,731)	\$ (1,506,825)	\$ (2,031,102)	\$ (1,952,305)	\$ 0

The Actuarial Valuation of Assets recognizes assumed investment income (line E3) fully each year. Differences between actual and assumed investment income (line E4) are phased in over a closed 5 year period. During periods when investment performance exceeds the assumed rate, Actuarial Value of Assets will tend to be less than market value. During periods when investment performance is less than the assumed rate, Actuarial Value of Assets will tend to be greater than market value. If assumed rates are exactly realized for 4 consecutive years, actuarial value will become equal to market value.



SCHEDULE C

STATEMENT OF ACTUARIAL ASSUMPTIONS AND METHODS

The assumptions and methods used in the valuation were based on the actuarial experience study for the five-year period ending June 30, 2013, submitted April 30, 2014, and adopted by the Board on December 4, 2014.

INVESTMENT RATE OF RETURN: 7.50% per annum, compounded annually for retirement and insurance benefits.

PRICE INFLATION: 3.25% per annum, compounded annually.

PAYROLL GROWTH: 4.00% per annum, compounded annually.

SALARY INCREASES: The assumed annual rates of future salary increases are as follows and include inflation at 4.00% per annum:

Service Years	Annual Rates of Salary Increases		
	Merit & Seniority	Base (Economy)	Increase Next Year
0-1	12.02%	4.00%	16.50%
1-2	7.21%	4.00%	11.50%
2-3	5.29%	4.00%	9.50%
3-4	4.33%	4.00%	8.50%
4-5	3.37%	4.00%	7.50%
5-6	2.40%	4.00%	6.50%
6-7	1.92%	4.00%	6.00%
7-8	1.92%	4.00%	6.00%
8-9	0.96%	4.00%	5.00%
9-10	0.48%	4.00%	4.50%
10 & Over	0.00%	4.00%	4.00%

DISABILITY: Representative assumed annual rates of disability are as follows:

Nearest Age	Annual Rates of Disability	
	Male	Female
20	0.05%	0.05%
30	0.09%	0.09%
40	0.20%	0.20%
50	0.56%	0.56%
60	1.46%	1.46%



RETIREMENT: The assumed annual rates of retirement are as follows:

Annual Rates of Retirement		
Service	Those Eligible for Service Retirement ⁺	Those Eligible for Service Retirement ⁺⁺
20	22.00%	
21	22.00%	
22	22.00%	
23	28.00%	
24	28.00%	
25	28.00%	22.00%
26	28.00%	22.00%
27	28.00%	22.00%
28	44.00%	28.00%
29	44.00%	28.00%
30	44.00%	28.00%
31	58.00%	28.00%
32	58.00%	28.00%
33	58.00%	44.00%
34	58.00%	44.00%
35	58.00%	44.00%
36	58.00%	58.00%
37	58.00%	58.00%
38	58.00%	58.00%
39	58.00%	58.00%
40	58.00%	58.00%

+ For members participating before September 1, 2008. The annual rate of service retirement is 100% at age 55.

++ For members participating on or after September 1, 2008. The annual rate of service retirement is 100% at age 60.



WITHDRAWAL: The assumed annual rates of withdrawal are as follows:

Service Years	Annual Rates of Withdrawal
0-1	20.00%
1-2	7.00%
2-9	3.00%
9 & Over	2.50%

DEATH BEFORE RETIREMENT: The rates of mortality for the period before retirement are according to the RP-2000 Combined Mortality Table projected with Scale BB to 2013 (multiplied by 50% for males and 30% for females).

DEATH AFTER RETIREMENT: The rates of mortality for the period after service retirement are according to the RP-2000 Combined Mortality Table projected with Scale BB to 2013 (set back 1 year for females) for all healthy retired members and beneficiaries. The RP-2000 Combined Disabled Mortality Table projected with Scale BB to 2013 (set back 4 years for males) is used for the period after disability retirement. These assumptions are used to measure the probabilities of each benefit payment being made after retirement. These assumptions contain margin for mortality improvements.

PERCENT MARRIED: 100% of employees are assumed to be married, with the wife 3 years younger than the husband.

DEPENDENT CHILDREN: For hazardous members' duty-related death benefits, it is assumed that the member is survived by two dependent children each age 6.

FORM OF PAYMENT: Participants are assumed to elect a life-only form of payment.

ASSET VALUATION METHOD: Five-year market related actuarial value, as developed in Schedule B. The actuarial value of assets recognizes a portion of the difference between the market value of assets and the expected actuarial value of assets, based on the ultimate assumed valuation rate of return. The amount recognized each year is 20% of the difference between market value and expected actuarial value.



ACTUARIAL COST METHOD: Costs were determined using the Entry Age Normal, Level Percentage of Pay Actuarial Cost Method. Under this method, a calculation is made for retirement benefits to determine the uniform and constant percentage rate of contribution which, if applied to the compensation of the average new member during the entire period of his or her anticipated covered service, would be required to meet the cost of benefits payable. Actuarial gains and losses are reflected in the unfunded actuarial accrued liability.

MULTIPLE STATUS/MULTIPLE SYSTEM MEMBERS: Some members may be represented under more than one retirement system and/or may have more than one status (e.g., active in one system, deferred vested in another and retired from a different system). For pension purposes, members that are active in one System but have service in another are assumed to retire from the System in which they are currently active. Any deferred pension benefits from another System are assumed to begin once the member terminates from their current active position. The insurance liabilities for multiple status/multiple system members are calculated assuming only one benefit is payable across all Systems and that benefit is payable from the combination of status and System which produces the highest economic value to the member.

AFFORDABLE CARE ACT (ACA): The impact of the Affordable Care Act (ACA) was addressed in this valuation. Review of the information currently available did not identify any specific provisions of the ACA that are anticipated to significantly impact results. While the impact of certain provisions such as the excise tax on high-value health insurance plans beginning in 2018 (if applicable), mandated benefits and participation changes due to the individual mandate should be recognized in the determination of liabilities, overall future plan costs and the resulting liabilities are driven by the assumed rate of health care inflation (i.e., trend). The trend assumption forecasts the anticipated increase to initial per capita costs, taking into account health care cost inflation, increases in benefit utilization, government-mandated benefits, and technological advances. Given the uncertainty regarding the ACA's implementation (e.g., the impact of excise tax on high-value health insurance plans, changes in participation resulting from the implementation of state-based health insurance exchanges), continued monitoring of the ACA's impact on the insurance liability will be required.

HEALTH CARE BENEFITS VALUED: Medical and drug benefits for retirees under age 65 and Medicare eligible.

HEALTH CARE SPOUSE AGE DIFFERENCE: Wives are assumed to be three years younger than husbands.

HEALTH CARE COST TREND RATES: Following is a chart detailing trend assumptions.

Year	Annual Rate of Increase		
	Under Age 65	Age 65 & Older	Dollar Contribution*
2015	7.50%	5.50%	1.50%
2016	6.75%	5.25%	1.50%
2017	6.25%	5.00%	1.50%
2018	5.75%	5.00%	1.50%
2019	5.25%	5.00%	1.50%
2020 & Beyond	5.00%	5.00%	1.50%

* Applies to members participating on or after July 1, 2003



HEALTH CARE AGE RELATED MORBIDITY: For retirees ages 65 and older, per capita health care costs are adjusted to reflect expected health care cost changes related to age. The increase to the net incurred claims was assumed to be:

Participant Age	Annual Increase
65 – 69	3.00%
70 – 74	2.50%
75 – 79	2.00%
80 – 84	1.00%
85 – 89	0.50%
90 & Beyond	0.00%

For the retiree health care liabilities of those under age 65, the current premium charged by the Kentucky Employees' Health Plan (KEHP) is used as the base cost and is projected forward using the healthcare trend assumption. No implicit rate subsidy is calculated or recognized as the implicit rate subsidy is deemed the responsibility of the KEHP.

HEALTH CARE DEFERRED VESTED BENEFIT RECIPIENT INITIAL AGE OF BENEFIT RECEIPT FOR MEMBERS: Health care benefits are assumed to begin at the following ages for deferred vested benefit recipients:

Deferred Vested Initial Age of Benefit Receipt		
Members Participating Before July 1, 2003	Members Participating Between July 1, 2003 to September 1, 2008	Members Participating On or After September 1, 2008
50	50	50



HEALTH CARE ANTICIPATED PLAN PARTICIPATION: Representative values of the assumed annual rates of member participation and spouse coverage are as follows:

Plan Elections of Covered Members Age 65 and Older as of January 1, 2016	
Kentucky Retirement System Health Plan	Hazardous
Medical Only	2.92%
Essential	1.44%
Premium	95.64%

Retirement Participation Rates			
Service at Retirement	Members Participating Before July 1, 2003	Members Participating Between July 1, 2003 to September 1, 2008	Members Participating On or After September 1, 2008
Under 10	100.00%	100.00%	100.00%
10 – 14	100.00%	100.00%	100.00%
15 – 19	100.00%	100.00%	100.00%
20+	100.00%	100.00%	100.00%

Disability/Death Participation Rates	
Members Participating Before July 1, 2003	
Duty-Disability	Duty Death-In-Service
100.00%	100.00%

Deferred Vested Member Participation Rates		
Members Participating Before July 1, 2003	Members Participating Between July 1, 2003 to September 1, 2008	Members Participating On or After September 1, 2008
100.00%	100.00%	100.00%

Members Electing Spouse Coverage		
Members Participating Before July 1, 2003	Members Participating Between July 1, 2003 to September 1, 2008	Members Participating On or After September 1, 2008
75.00%	75.00%	75.00%



HEALTH CARE MONTHLY PLAN COSTS: Assumed per capita health care costs were based on past experience and trended based on the assumptions. Following are charts detailing retiree per capita assumptions for the year following the valuation date. The amounts include medical and drug costs. Members under 65 are assumed to elect the LivingWell PPO. For retirees ages 65 and older, the full costs shown are before averaging. The average costs are then normalized to age 65 and age adjusted in calculating liabilities. The dollar amount contribution level is the cost to the system per year of service for members participating on or after July 1, 2003.

Under Age 65 (KEHP) Full Costs as of January 1, 2016				
Tier Elected	LivingWell CDHP	LivingWell PPO	Standard PPO	Standard CDHP
Single	\$ 702.10	\$ 721.14	\$ 677.74	\$ 663.68
Parent Plus	967.18	1,023.04	963.36	930.34
Couple	1,302.74	1,564.20	1,474.84	1,429.26
Family	1,453.94	1,738.40	1,640.84	1,591.52
Family C-R	810.00	865.64	814.72	792.90

Age 65 and Older Full Costs as of January 1, 2016	
Kentucky Retirement System Health Plan - Medical Only	\$158.25
Kentucky Retirement System Health Plan - Essential	77.76
Kentucky Retirement System Health Plan - Premium	244.25

Age 65 and Older Average Cost as of the Valuation Date Based on Actual Retiree Elections
Hazardous
\$227.19

Dollar Amount Contribution Level Per Year of Service as of July 1, 2015
Applies to members participating on or after July 1, 2003
Hazardous
\$19.19



SCHEDULE D

SUMMARY OF MAIN BENEFIT AND CONTRIBUTION PROVISIONS

This schedule summarizes the major retirement benefit provisions of SPRS included in the valuation. It is not intended to be, nor should it be interpreted as, a complete statement of all plan provisions.

Plan Year: July 1 through June 30

Normal Retirement:

Members whose participation began before 9/1/2008

Age Requirement 55

Service Requirement At least one month of hazardous duty service credit

Amount If a member has at least 60 months of service, the monthly benefit is 2.50% multiplied by final average compensation, multiplied by years of service.

Final compensation is calculated by taking the average of the highest three (3) fiscal years of salary. If the number of months of service credit during the three (3) year period is less than twenty-four (24), one (1) or more additional fiscal years shall be used.

If a member has less than 60 months of service, the monthly benefit is the actuarial equivalent of two times the member's contributions with interest.

Members whose participation began on or after 9/1/2008 but before 1/1/2014

Age Requirement 60

Service Requirement At least 60 months of hazardous duty service credit

Amount The monthly benefit is the following benefit factor based on service credit at retirement, multiplied by final average compensation, multiplied by years of service.

Service Credit	Benefit Factor
10 years or less	1.30%
10+ – 20 years	1.50%
20+ – 25 years	2.25%
25+ years	2.50%

Final compensation is calculated by taking the average of the highest three (3) complete fiscal years of salary. Each fiscal year used to determine final compensation must contain twelve (12) months of service credit.

If a member has less than 60 months of service, the monthly benefit is the actuarial equivalent of two times the member's contributions with interest.



Normal Retirement (continued):

Members whose participation began on or after 1/1/2014

<i>Age Requirement</i>	60
<i>Service Requirement</i>	At least 60 months of hazardous duty service credit or 25 or more years of service, with no age requirement
<i>Amount</i>	<p>Each year that a member is an active contributing member to the System, the member and the member's employer will contribute 8.00% and 7.50% of creditable compensation respectively into a hypothetical account. This hypothetical account will earn interest annually on both the member's and employer's contribution at a minimum rate of 4%. If the System's geometric average net investment return for the previous five years exceeds 4%, then the hypothetical account will be credited with an additional amount of interest equal to 75% of the amount of the return which exceeds 4%. All interest credits will be applied to the hypothetical account balance on June 30 based on the account balance as of June 30 of the previous year.</p> <p>Upon retirement the hypothetical account which includes member contributions, employer contributions and interest credits can be withdrawn from the System as a lump sum or annuitized into a single life annuity option.</p>

Early Retirement:

Members whose participation began before 9/1/2008

<i>Requirement</i>	Age 50 with 15 years of service or any age with 20 years of service.
<i>Amount</i>	Normal retirement benefit reduced by 6.5% per year for the first five years and 4.5% per year for the next five years for each year the member is younger than age 55 or has less than 20 years of service, whichever is smaller.

Members whose participation began on or after 9/1/2008 but before 1/1/2014

<i>Requirement</i>	Age 50 with 15 years of service or any age with 25 years of service.
<i>Amount</i>	Normal retirement benefit reduced by 6.5% per year for the first five years and 4.5% per year for the next five years for each year the member is younger than age 60 or has less than 25 years of service, whichever is smaller.



Disability:

Age Requirement

None

Service Requirement

60 months (waived if in line of duty disability)

Members whose participation began before 8/1/2004

Normal retirement benefit except if the member's total service credit is less than 20 years, service credit will be added for the period from the last day of paid employment to the member's 55th birthday.

The maximum service credit added will not exceed the total service the member had on this last day of paid employment and the maximum service credit for calculating his retirement allowance, including total service and service added will not exceed 20 years. May not apply if eligible for an unreduced retirement allowance.

A member in a hazardous position who is disabled in the line of duty is entitled to the normal retirement benefit based on years of service and final compensation determined as of the date of disability (no penalty), except that the monthly retirement allowance payable shall not be less than 25% of the member's monthly final rate of pay. Each dependent child shall receive 10% of the disabled member's monthly final rate of pay; however the total maximum dependent children's benefit shall not exceed 40% of the member's monthly final rate of pay.

Members whose participation began on or after 8/1/2004 but before 1/1/2014

Normal retirement benefit based on years of service and final compensation determined as of the date of disability (no penalty) or, if larger, 25% of the member's monthly final rate of pay.

Members whose participation began on or after 1/1/2014

The hypothetical account which includes member contributions, employer contributions and interest credits can be withdrawn from the System as a lump sum or an annuity equal to the larger of 25% of the member's monthly final rate of pay or the annuitized hypothetical account into a single life annuity option.



Vesting:

Members whose participation began before 9/1/2008

<i>Age Requirement</i>	None
<i>Service Requirement</i>	60 months. Service purchased after August 1, 2004 does not count toward vesting insurance benefits. Service purchased by employees who began participating on or after August 1, 2004 does not count toward vesting retirement benefits. Recontribution of refunds and omitted service purchases are the exception to this rule for service requirement.
<i>Amount</i>	Normal retirement benefit deferred to normal retirement age or reduced benefit payable at early retirement age.
<i>Normal Retirement Age</i>	55

Members whose participation began on or after 9/1/2008 but before 1/1/2014

<i>Age Requirement</i>	None
<i>Service Requirement</i>	60 months.
<i>Amount</i>	Normal retirement benefit deferred to normal retirement age or reduced benefit payable at early retirement age.

Members whose participation began on or after 1/1/2014

<i>Age Requirement</i>	None
<i>Service Requirement</i>	60 months.
<i>Amount</i>	Upon termination the hypothetical account which includes member contributions, employer contributions and interest credits can be withdrawn from the System as a lump sum or the member can elect to leave the hypothetical account balance in the System. If the member does not withdraw the account balance, it will continue to earn 4% interest. Upon reaching normal retirement age the member can apply for retirement and receive the account balance as a lump sum payment or annuitize the account balance into a single life annuity.



Pre-Retirement Death Benefit (not in line of duty):

Members whose participation began before 1/1/2014

Requirement Eligible for Normal or Early Retirement, or any age in active employment with 60 months service, or any age and not in active employment with at least 144 months of service.

Amount Benefit equal to the benefit the member would have received had the member retired on the day before the date of death and elected a 100% joint and survivor form. Benefit is actuarially reduced if member is less than normal retirement age at the date of death.

Members whose participation began on or after 1/1/2014

Requirement 60 months service

Amount The maximum of the benefit equal to the benefit the member would have received had the member retired on the day before the date of death.

Spouse's Pre-Retirement Death Benefit (in line of duty):

Requirement None

Amount The spouse may choose (1) a \$10,000 lump sum payment and monthly payments of 25% of the member's final monthly rate of pay or (2) benefit options offered under death not in line of duty.

Dependent Non-Spouse's Death Benefit (in line of duty):

Requirement None

Amount The non-spouse may choose (1) a \$10,000 lump sum payment or (2) benefit options offered under death not in line of duty.

Dependent Child's Death Benefit (in line of duty):

Requirement None

Amount 10% of member's final monthly rate of pay. Dependent child payments cannot exceed 40% of the member's monthly final rate of pay.



Post-Retirement Death Benefit:

Requirement

Retired member in receipt of monthly benefit based on at least 48 months or more of combined service with KERS, CERS or SPRS.

Amount

\$5,000

Member Contributions:

Members whose participation began before 9/1/2008

8% of all creditable compensation. Interest paid on the members' accounts is currently set at 2.5% and per statute, shall not be less than 2.0%. Member entitled to a full refund of contributions with interest.

Members whose participation began on or after 9/1/2008 and up to 1/1/2014

9% of all creditable compensation, with 8% being credited to the member's account and 1% deposited to the KRS 401(h) Account. Interest paid on the members' accounts will be set at 2.5%. Member entitled to a full refund of contributions and interest in their individual account, however, the 1% contributed to the insurance fund is non-refundable.

Members whose participation began on or after 1/1/2014

9% of all creditable compensation, with 8% being credited to the member's account and 1% deposited to the KRS 401(h) Account. Member entitled to a full refund of contributions and interest on the member's portion of the hypothetical account, however, the 1% contributed to the insurance fund is non-refundable.



Insurance Plan for Retirees:

Members whose participation began before 7/1/2003

Requirement

In receipt of a monthly retirement allowance.

Amount

The Retirement System pays a portion of lifetime medical premiums for retirees, their spouse and their dependents based on the retired member's years of service credit. The percentage of the monthly contribution rate paid is show in the following table.

Service Credit	Percentage Paid*
0 – 3 years	0%
4 – 9 years	25%
10 – 14 years	50%
15 – 19 years	75%
20 or more years	100%

**100% of the monthly contribution is paid towards the health insurance for a member, member's spouse and dependents if the member is disabled in the line of duty as a result of a duty-related injury, regardless of actual service. 100% of the monthly contribution is paid toward health insurance for the spouse and dependent children of a member who dies in the line of duty regardless of the deceased member's service. The insurance benefit will be provided as long as the spouse and dependent children are eligible for a monthly retirement benefit.*

Members whose participation began on or after 7/1/2003, but before 9/1/2008

Requirement

Monthly retirement allowance with at least 120 months of service at retirement.

Amount

The Retirement System pays \$19.19 per month for each year of earned service for retirees. Upon the retiree's death, the surviving spouse will receive \$12.80 per month for each year of earned. These amounts are shown as of the valuation date and will be increased annually by 1.5%.

Members whose participation began on or after 9/1/2008

Requirement

Monthly retirement allowance with at least 180 months of service at retirement.

Amount

The Retirement System pays \$19.19 per month for each year of earned service for retirees. Upon the retiree's death, the surviving spouse will receive \$12.80 per month for each year of earned. These amounts will be increased annually by 1.5%.



Retired Lives Summary June 30, 2015

	Male Lives		Female Lives		Total	
	Number	Monthly Benefits	Number	Monthly Benefits	Number	Monthly Benefits
Basic Form	134	\$ 402,957.64	14	\$ 43,388.33	148	\$ 446,345.97
Straight Life (Old Plan)	0	0.00	0	0.00	0	0.00
Joint & Survivor						
100% to Beneficiary	133	429,211.15	1	4,813.66	134	434,024.81
66-2/3% to Beneficiary	82	313,940.19	2	7,541.82	84	321,482.01
50% to Beneficiary	85	309,723.84	1	2,604.67	86	312,328.51
Pop-up Option	543	1,948,838.63	4	10,805.22	547	1,959,643.85
10 Years Certain	3	9,656.29	0	0.00	3	9,656.29
10 Years Certain & Life	37	115,460.88	2	5,033.86	39	120,494.74
Social Security Option						
Age 62 Basic	30	82,882.80	0	0.00	30	82,882.80
Age 62 Survivorship	124	256,317.49	1	7,930.47	125	264,247.96
Partial Deferred (Old Plan)	0	0.00	0	0.00	0	0.00
Widows Age 60	0	0.00	0	0.00	0	0.00
Dependent Child	0	0.00	0	0.00	0	0.00
Refund	0	0.00	0	0.00	0	0.00
15 Years Certain & Life	18	48,399.66	1	3,918.67	19	52,318.33
20 Years Certain & Life	36	112,009.10	2	3,978.81	38	115,987.91
5 Years Certain	0	0.00	0	0.00	0	0.00
PLSO 12 Month Basic	0	0.00	0	0.00	0	0.00
PLSO 24 Month Basic	0	0.00	0	0.00	0	0.00
PLSO 36 Month Basic	0	0.00	2	466.41	2	466.41
PLSO 12 Month Survivor	6	20,781.22	0	0.00	6	20,781.22
PLSO 24 Month Survivor	4	5,952.60	0	0.00	4	5,952.60
PLSO 36 Month Survivor	9	16,914.11	0	0.00	9	16,914.11
Total	1,244	\$ 4,073,045.60	30	\$ 90,481.92	1,274	\$ 4,163,527.52



Beneficiary Lives Summary June 30, 2015

	Male Lives		Female Lives		Total	
	Number	Monthly Benefits	Number	Monthly Benefits	Number	Monthly Benefits
Basic Form	0	\$ 0.00	5	\$ 4,584.52	5	\$ 4,584.52
Straight Life (Old Plan)	0	0.00	0	0.00	0	0.00
Joint & Survivor						
100% to Beneficiary	6	5,883.26	60	160,931.82	66	166,815.08
66-2/3% to Beneficiary	2	1,206.05	10	18,639.77	12	19,845.82
50% to Beneficiary	0	0.00	15	21,773.84	15	21,773.84
Pop-up Option	2	1,154.22	33	88,328.02	35	89,482.24
10 Years Certain	0	0.00	0	0.00	0	0.00
10 Years Certain & Life	0	0.00	1	389.49	1	389.49
Social Security Option						
Age 62 Basic	0	0.00	2	2,281.46	2	2,281.46
Age 62 Survivorship	0	0.00	42	83,903.41	42	83,903.41
Partial Deferred (Old Plan)	0	0.00	0	0.00	0	0.00
Widows Age 60	0	0.00	0	0.00	0	0.00
Dependent Child	0	0.00	0	0.00	0	0.00
Refund	0	0.00	1	893.10	1	893.10
15 Years Certain & Life	0	0.00	0	0.00	0	0.00
20 Years Certain & Life	1	6,685.69	5	10,001.56	6	16,687.25
5 Years Certain	0	0.00	0	0.00	0	0.00
PLSO 12 Month Basic	0	0.00	0	0.00	0	0.00
PLSO 24 Month Basic	0	0.00	0	0.00	0	0.00
PLSO 36 Month Basic	0	0.00	0	0.00	0	0.00
PLSO 12 Month Survivor	0	0.00	0	0.00	0	0.00
PLSO 24 Month Survivor	0	0.00	1	7,351.41	1	7,351.41
PLSO 36 Month Survivor	0	0.00	0	0.00	0	0.00
Total	11	\$ 14,929.22	175	\$ 399,078.40	186	\$ 414,007.62



**Retired and Beneficiary Information June 30, 2015
Tabulated by Attained Ages**

Attained Age	Retirement		Disability Retirement		Survivors and Beneficiaries		Total	
	No.	Annual Benefits	No.	Annual Benefits	No.	Annual Benefits	No.	Annual Benefits
Under 45	35	\$ 1,340,592	9	\$ 165,095	16	\$ 100,053	60	\$ 1,605,740
45-49	138	5,428,008	6	127,998	2	33,062	146	5,589,068
50-54	166	6,844,378	7	90,601	4	47,830	177	6,982,809
55-59	138	5,783,238	6	122,091	16	264,134	160	6,169,463
60-64	233	9,688,311	8	92,961	15	412,444	256	10,193,716
65-69	267	10,692,229	8	181,486	29	805,643	304	11,679,358
70-74	116	4,258,029	3	46,115	30	830,307	149	5,134,451
75-79	67	2,399,808	3	74,826	12	425,362	82	2,899,996
80-84	41	1,661,546	2	33,710	23	816,263	66	2,511,519
85-89	16	693,429	0	0	23	721,813	39	1,415,242
90 & Over	5	237,880	0	0	16	511,179	21	749,059
Totals	1,222	\$ 49,027,448	52	\$ 934,883	186	\$ 4,968,090	1,460	\$ 54,930,421



**Total Active Members as of June 30, 2015
Tabulated by Attained Ages and Years of Service**

Attained Age	Years of Service to Valuation Date							Totals	
	0-4	5-9	10-14	15-19	20-24	25-26	27-29		30+
Under 20 Avg Pay									
20-24 Avg Pay	52 \$23,785								52 \$23,785
25-29 Avg Pay	129 \$34,949	22 \$46,312							151 \$36,605
30-34 Avg Pay	65 \$41,095	60 \$47,883	38 \$51,183						163 \$45,946
35-39 Avg Pay	34 \$41,363	37 \$48,770	115 \$53,103	28 \$54,816	1 \$16,195				215 \$50,552
40-44 Avg Pay	13 \$37,723	18 \$49,029	62 \$53,025	70 \$59,002	32 \$69,237	1 \$75,491			196 \$56,539
44-49 Avg Pay	4 \$44,050	11 \$49,587	23 \$52,983	39 \$57,631	26 \$66,983	7 \$64,101	2 \$88,500		112 \$58,528
50-54 Avg Pay		4 \$49,741	10 \$51,639	5 \$60,847	12 \$62,976	3 \$75,967	1 \$91,416	1 \$76,089	36 \$60,297
55-59 Avg Pay		2 \$46,862		1 \$48,983				6 \$76,823	9 \$67,072
60-64 Avg Pay				1 \$67,383				1 \$78,353	2 \$72,868
65-69 Avg Pay								1 \$85,601	1 \$85,601
70 & over Avg Pay									
Totals Avg Pay	297 \$35,318	154 \$48,162	248 \$52,719	144 \$57,870	71 \$66,607	11 \$68,372	3 \$89,472	9 \$77,887	937 \$48,842



SCHEDULE F

SENSITIVITY ANALYSIS

The valuation results are projections based on the actuarial assumptions. Actual experience will differ from these assumptions, either increasing or decreasing cost. The charts on the following pages provide a simple analysis on how the costs are sensitive to changes to the assumed discount rate, the assumed inflation rate and the rate of payroll growth. The charts show the actuarial accrued liability, the unfunded liability, the funded ratio and the employer contribution rate under the following scenarios:

- The discount rate assumption sensitivity analysis shows the valuation results with the baseline discount rate assumption, 7.50%, together with a decrease in the discount rate to 6.50% and an increase in the discount rate to 8.50%. Under this scenario, the underlying inflation rate assumption is held constant at 3.25% and the payroll growth assumption is held constant at 4.00%.
- The inflation assumption sensitivity analysis shows the valuation results with the baseline underlying inflation rate assumption, 3.25%, together with decreases in the inflation rate to 3.00% and 2.75%. Under this scenario, the decrease in the underlying inflation rate assumption leads to corresponding decreases in the discount rate, the payroll growth assumption and the healthcare trend assumption for members hired before 7/1/2003.
- The payroll growth assumption sensitivity analysis shows the valuation results with the baseline underlying payroll growth assumption, 4.00%, together with decreases in the payroll growth assumption to 2.00% and 0.00%. Under this scenario, all other assumptions, including the individual member salary scale, are held constant so that the only impact is in the amortization of the unfunded liability, leading to higher employer contribution rates.



ASSUMED DISCOUNT RATE SENSITIVITY ANALYSIS

	Decrease Discount Rate	Valuation Results	Increase Discount Rate
Retirement			
Actuarial Accrued Liability	\$ 811,020,318	\$ 734,156,446	\$ 669,475,953
Actuarial Value of Assets	<u>248,387,946</u>	<u>248,387,946</u>	<u>248,387,946</u>
Unfunded Liability	\$ 562,632,372	\$ 485,768,500	\$ 421,088,007
Funded Ratio	30.63%	33.83%	37.10%
Contribution Rate	71.87%	66.47%	61.85%
Discount Rate	6.50%	7.50%	8.50%
Payroll Growth	4.00%	4.00%	4.00%
Inflation Rate	3.25%	3.25%	3.25%
Insurance			
Actuarial Accrued Liability	\$ 288,119,708	\$ 254,838,710	\$ 227,600,636
Actuarial Value of Assets	<u>167,774,940</u>	<u>167,774,940</u>	<u>167,774,940</u>
Unfunded Liability	\$ 120,344,768	\$ 87,063,770	\$ 59,825,696
Funded Ratio	58.23%	65.84%	73.71%
Contribution Rate	23.75%	18.87%	14.60%
Discount Rate	6.50%	7.50%	8.50%
Payroll Growth	4.00%	4.00%	4.00%
Inflation Rate	3.25%	3.25%	3.25%
SPRS Total			
Actuarial Accrued Liability	\$ 1,099,140,026	\$ 988,995,156	\$ 897,076,589
Actuarial Value of Assets	<u>416,162,886</u>	<u>416,162,886</u>	<u>416,162,886</u>
Unfunded Liability	\$ 682,977,140	\$ 572,832,270	\$ 480,913,703
Funded Ratio	37.86%	42.08%	46.39%
Contribution Rate	95.62%	85.34%	76.45%
Discount Rate	6.50%	7.50%	8.50%
Payroll Growth	4.00%	4.00%	4.00%
Inflation Rate	3.25%	3.25%	3.25%



INFLATION ASSUMPTION SENSITIVITY ANALYSIS

Valuation Results	Decrease Inflation Rate 25 basis points	Decrease Inflation Rate 50 basis points
Retirement		
Actuarial Accrued Liability	\$ 734,156,446	\$ 751,321,300
Actuarial Value of Assets	<u>248,387,946</u>	<u>248,387,946</u>
Unfunded Liability	\$ 485,768,500	\$ 502,933,354
Funded Ratio	33.83%	33.06%
Contribution Rate	66.47%	69.16%
Discount Rate	7.50%	7.25%
Payroll Growth	4.00%	3.75%
Inflation Rate	3.25%	3.00%
Insurance		
Actuarial Accrued Liability	\$ 254,838,710	\$ 255,247,724
Actuarial Value of Assets	<u>167,774,940</u>	<u>167,774,940</u>
Unfunded Liability	\$ 87,063,770	\$ 87,472,784
Funded Ratio	65.84%	65.73%
Contribution Rate	18.87%	19.01%
Discount Rate	7.50%	7.25%
Payroll Growth	4.00%	3.75%
Inflation Rate	3.25%	3.00%
SPRS Total		
Actuarial Accrued Liability	\$ 988,995,156	\$ 1,006,569,024
Actuarial Value of Assets	<u>416,162,886</u>	<u>416,162,886</u>
Unfunded Liability	\$ 572,832,270	\$ 590,406,138
Funded Ratio	42.08%	41.34%
Contribution Rate	85.34%	88.17%
Discount Rate	7.50%	7.25%
Payroll Growth	4.00%	3.75%
Inflation Rate	3.25%	3.00%



PAYROLL GROWTH ASSUMPTION SENSITIVITY ANALYSIS

	Valuation Results	Decrease Payroll Growth 2%	No Payroll Growth
Retirement			
Actuarial Accrued Liability	\$ 734,156,446	\$ 734,156,446	\$ 734,156,446
Actuarial Value of Assets	<u>248,387,946</u>	<u>248,387,946</u>	<u>248,387,946</u>
Unfunded Liability	\$ 485,768,500	\$ 485,768,500	\$ 485,768,500
Funded Ratio	33.83%	33.83%	33.83%
Contribution Rate	66.47%	81.29%	98.28%
Discount Rate	7.50%	7.50%	7.50%
Payroll Growth	4.00%	2.00%	0.00%
Inflation Rate	3.25%	3.25%	3.25%
Insurance			
Actuarial Accrued Liability	\$ 254,838,710	\$ 254,838,710	\$ 254,838,710
Actuarial Value of Assets	<u>167,774,940</u>	<u>167,774,940</u>	<u>167,774,940</u>
Unfunded Liability	\$ 87,063,770	\$ 87,063,770	\$ 87,063,770
Funded Ratio	65.84%	65.84%	65.84%
Contribution Rate	18.87%	21.26%	23.91%
Discount Rate	7.50%	7.50%	7.50%
Payroll Growth	4.00%	2.00%	0.00%
Inflation Rate	3.25%	3.25%	3.25%
SPRS Total			
Actuarial Accrued Liability	\$ 988,995,156	\$ 988,995,156	\$ 988,995,156
Actuarial Value of Assets	<u>416,162,886</u>	<u>416,162,886</u>	<u>416,162,886</u>
Unfunded Liability	\$ 572,832,270	\$ 572,832,270	\$ 572,832,270
Funded Ratio	42.08%	42.08%	42.08%
Contribution Rate	85.34%	102.55%	122.19%
Discount Rate	7.50%	7.50%	7.50%
Payroll Growth	4.00%	2.00%	0.00%
Inflation Rate	3.25%	3.25%	3.25%

