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BY:

December 18, 2015

CONFIDENTIAL

Ms. Ronda Stegmann
Legislative & Policy Coordinator
Missouri State Employees'
Retirement System
907 Wildwood Drive
Jefferson City, MO 65109

Re: Senate Bill No. 680 (SB 680)

Dear Ronda:

Enclosed are the results of a supplemental actuarial valuation related to a proposed benefit change for the Missouri State Employees' Retirement System's June 30, 2015 valuation.

If you have any questions or comments, please contact us.

Respectfully submitted,

Brad Lee Armstrong

Brad Lee Armstrong, ASA, EA, FCA, MAAA

David T. Kausch

David T. Kausch, FSA, EA, FCA, MAAA

BLA/DTK:bd
Enclosures

Missouri State Employees' Retirement System
Supplemental Actuarial Valuation
as of June 30, 2015

REQUESTED BY: Mr. John Watson, Executive Director

SUBMITTED BY: Brad Lee Armstrong, ASA, EA, FCA, MAAA and David T. Kausch, FSA, EA, FCA, MAAA
Gabriel, Roeder, Smith & Company

DATE: December 18, 2015

This report presents results of a supplemental actuarial valuation to measure the effect of eliminating defined benefit and providing defined contribution retirement benefits for members of the General Assembly (Legislators) and statewide Elected Officials who first take office on or after January 1, 2017.

This report is intended to describe the financial effect of the proposed changes. No statement in this report is intended to be interpreted as a recommendation in favor of the changes, or in opposition to them. The date of the valuation was June 30, 2015. Brad Lee Armstrong and David T. Kausch are Members of the American Academy of Actuaries (MAAA) and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

If the scheduled contributions are made (subject to normal year-to-year experience fluctuations), then the System will be able to pay all benefits promised, when due. Our understanding is that the State is currently paying the appropriate total contribution rate.

Actuarial assumptions and methods were consistent with those used in the regular actuarial valuation of the Retirement System on the valuation date, unless otherwise noted. In particular:

- The assumed rate of interest was 8.0%.
- Payroll was assumed to increase 3% per year.
- For the regular valuation, the Unfunded Actuarial Accrued Liability is amortized over 30 years.

We believe the assumptions are internally consistent and reasonable, based on the actual experience of MOSERS. These actuarial assumptions and methods comply with current actuarial standards of practice.

The active group size is assumed to remain constant. For purposes of this supplemental valuation, the active group for Legislators and Elected Officials is assumed to decline under the assumptions disclosed herein.

A brief summary of the data used in this valuation follows:

Valuation Group	Number	Payroll	Group Averages		
			Salary	Age(yrs.)	Service(yrs.)
General Assembly	195	$ 7,011,225	$ 35,955	51.7	4.5
Elected Officials	6	659,970	109,995	46.7	7.7
Total MOSERS	49,980	1,918,532,280	38,386	45.6	11.2

For Members of the General Assembly (Legislators) or Elected Officials Hired on and after January 1, 2017:

Eliminate defined benefit plan retirement benefits for members of the General Assembly (Legislators) and statewide Elected Officials who first take office on or after January 1, 2017. A retired state employee who retired under the Year 2000 plan and holds one of these elected offices for the first time on or after January 1, 2017 will also be prohibited from receiving retirement benefits from the Missouri State Employees' Retirement System during his or her term of office, and shall not be eligible to accrue additional benefits based on service as a member of the General Assembly or as statewide Elected Official.

Members of the General Assembly and statewide Elected Officials who first take office on or after January 1, 2017, shall be eligible to participate in a defined contribution plan, in which the employer shall contribute 4.0% of the participant's payroll and the member shall contribute 4.0% of the participant's payroll.

The proposed removal of defined benefits for new hires has **no effect** on the MOSERS current benefit obligation for the active members currently covered under the Missouri State Employees' Retirement System MSEP plan, MSEP 2000 plan, and MSEP 2011 plan. To the extent there is an election which results in Members of the General Assembly or Statewide Elected Officials taking office on or after January 1, 2017, there may be an associated reduction in employer normal cost dollar contributions.

Missouri State Employees' Retirement System
Supplemental Actuarial Valuation
as of June 30, 2015

Actuarial Statement

	Impact on MOSERS DB Employer Contributions		
	Present Benefits	Proposed Benefits	Increase/ (Decrease)
FY 2016-2017 Contribution			
Total Normal Cost	8.18 %	8.17 %	(0.01) %
Member Contribution Rate	(1.51)	(1.50)	0.01
UAAL%	9.67	9.67	0.00
Total Employer Contribution Rate	16.34 %	16.34 %	0.00 %
Employer Normal Cost ($ millions)	$ 131.8	$ 131.8	$ (0.0)
Estimated Employer Contribution ($ millions)*	$ 323.0	$ 322.9	$ (0.1)
Valuation Results as of June 30, 2015 ($ millions)			
Market Value of Assets (MVA)	$ 8,516.7	$ 8,516.7	$ -
Actuarial Accrued Liability (AAL)	11,727.6	11,727.6	-
Actuarial Value of Assets (AVA)	8,792.5	8,792.5	-
Unfunded Actuarial Accrued Liability (UAAL)	$ 2,935.1	$ 2,935.1	$ -
Percent Funded	75.0 %	75.0 %	0.0 %

* *Illustrative only. Estimated employer contribution amounts (shown in $ millions) are based on the Total Computed Employer Contribution Rate shown and valuation payroll projected two years to the applicable fiscal year using the valuation assumptions of 0% for the first year and 3% for the second year. The projection on the following page uses a similar procedure, but it is applied to each individual participant as opposed to the aggregated approach used in this page, which results in small differences when computed.*

The Estimated employer contribution amount for the 'Proposed' scenario reflects the reduction in payroll anticipated for the fiscal year ending 2017 due to the elimination of defined benefit plan retirement benefits for members of the General Assembly (Legislators) and statewide Elected Officials who first take office on or after January 1, 2017

Missouri State Employees' Retirement System
Supplemental Actuarial Valuation
as of June 30, 2015

Projected Change in Annual Employer Contributions
(In Thousands)

	Current Provisions (Beginning of Year)				Proposed Provisions (Beginning of Year)				Projected DB Employer Contributions						Projected DC Employer Contributions@	Total Projected (DB +DC) Employer Contributions
									Current		Est. Impact		Proposed		Proposed	Proposed
Fiscal Year	Projected AAL	Projected AVA	Funded Ratio	Projected MVA	Projected AAL	Projected AVA	Funded Ratio	Projected MVA	Rate	Dollars	Rate#	Dollars	Rate	Dollars	Dollars	Dollars
2016	$11,727,618	$ 8,792,486	75.0%	$ 8,516,655	$11,727,618	$ 8,792,486	75.0%	$8,516,655								
2017	12,087,011	9,118,237	75.4%	9,125,928	12,086,907	9,118,237	75.4%	9,125,928	16.34%	$ 317,259	0.00%	$ (96)	16.34%	$ 317,163	$ 23	$ 317,187
2018	12,419,866	9,411,492	75.8%	9,366,138	12,419,342	9,411,072	75.8%	9,365,301	16.11%	319,852	(0.02%)	(676)	16.09%	319,176	69	319,245
2019	12,722,292	9,677,451	76.1%	9,624,627	12,721,011	9,676,148	76.1%	9,622,496	15.88%	322,769	(0.01%)	(667)	15.87%	322,102	117	322,219
2020	12,996,655	9,918,723	76.3%	9,859,006	12,994,265	9,916,252	76.3%	9,855,288	15.68%	326,516	(0.03%)	(1,241)	15.65%	325,275	158	325,433
2021	13,246,944	10,140,023	76.5%	10,073,928	13,243,084	10,135,858	76.5%	10,068,110	15.48%	330,462	(0.03%)	(1,395)	15.45%	329,067	195	329,263
2022	13,475,752	10,344,252	76.8%	10,272,097	13,470,065	10,338,078	76.7%	10,263,905	15.28%	334,654	(0.02%)	(1,307)	15.26%	333,347	228	333,575
2023	13,689,286	10,537,917	77.0%	10,459,957	13,681,407	10,529,635	77.0%	10,449,283	15.10%	339,515	(0.03%)	(1,639)	15.07%	337,876	256	338,132
2024	13,885,916	10,720,245	77.2%	10,636,807	13,875,521	10,709,352	77.2%	10,623,270	14.91%	344,357	(0.01%)	(1,269)	14.90%	343,088	279	343,367
2025	14,064,021	10,889,823	77.4%	10,801,297	14,050,828	10,876,299	77.4%	10,784,841	14.76%	350,368	(0.04%)	(2,045)	14.72%	348,323	298	348,621
2026	14,223,648	11,047,863	77.7%	10,954,427	14,207,400	11,031,003	77.6%	10,934,522	14.60%	356,356	(0.02%)	(1,634)	14.58%	354,722	314	355,036
2027	14,365,891	11,196,030	77.9%	11,098,041	14,346,362	11,175,856	77.9%	11,074,615	14.45%	362,833	(0.03%)	(1,939)	14.42%	360,894	329	361,223

#The ultimate impact on the normal cost is a decrease of 0.07% of projected valuation payroll.
@The ultimate DC contribution is 0.016% of projected total valuation payroll.

			Post 1/1/2017 Payroll	
Fiscal Year	BOY Valuation Payroll Projected	Pre 1/1/2017 Payroll*	All Others	Elected Officials & General Assembly
2016	$ 1,901,091	$ 1,901,091	$ -	$ -
2017	1,941,611	1,843,658	97,367	587
2018	1,985,426	1,705,327	278,365	1,734
2019	2,032,549	1,591,693	437,937	2,920
2020	2,082,374	1,493,140	585,296	3,939
2021	2,134,768	1,405,114	724,771	4,883
2022	2,190,146	1,324,357	860,095	5,694
2023	2,248,444	1,247,492	994,555	6,397
2024	2,309,572	1,173,181	1,129,426	6,965
2025	2,373,768	1,101,723	1,264,602	7,443
2026	2,440,792	1,032,718	1,400,215	7,858

**DB, DC and Total Contribution Rates are based on open group payroll.*
DC Contributions based on 4% employer contribution for Post-2017 hires for Elected Officials and members of the General Assembly only.

Numbers may not add due to rounding.

Comment A: The long-term effect of the proposed changes on Defined Benefit contributions is a decrease in the employer normal cost of approximately 0.07% of total MOSERS payroll. The UAAL rate may increase as the payroll decreases due to future Elected Officials joining the DC plan.

Comment B: We assumed that all current DB Elected Officials would stay in the DB plan.

Comment C: While we did not test the benefit, the DC benefit based off 8% of payroll contributions is likely less than the benefit from the DB plan.

Comment D: At the September 17, 2014 Board meeting, the Board adopted a minimum funding policy such that the employer contribution rate will be no less than 16.97% of payroll (the rate calculated in the June 30, 2013 valuation) until such a time as the plan is at least 80% funded on an actuarial value of assets basis. Additionally, any benefit increase will result in a commensurate increase in the minimum contribution rate of 16.97%. This supplemental valuation does not reflect the 16.97% policy minimum requirement. Since the proposed change is not an increase in system benefits, the rate of 16.97% is unchanged by the proposal.

Comment E: The calculations are based upon assumptions regarding future events, which may or may not materialize. They are also based upon present and proposed assumptions that are outlined in the report. If you have reason to believe that the assumptions that were used are unreasonable, that the plan provisions are incorrectly described, that important plan provisions relevant to this proposal are not described, or that conditions have changed since the calculations were made, you should contact the authors of this report prior to relying on information in the report.

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

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

Comment H: This report is intended to describe the financial effect of the proposed plan changes on the Retirement System. Except as otherwise noted, potential effects on other benefit plans were not considered.

Comment I: The reader of this report should keep in mind that actuarial calculations are mathematical estimates based on current data and assumptions about future events (which may or may not materialize). Please note that actuarial calculations can and do vary from one valuation year to the next. As a result, the cost impact of a benefit change may fluctuate over time, as the demographics of the group changes. Fluctuations from one year to the next may be more pronounced when dealing with small group sizes.

Summary of Assumptions Used

for the June 30, 2015 Actuarial Valuation

All actuarial assumptions are expectations of future experience, not market measures. The rationale for the actuarial assumption is based on the System's investment policy, capital market expectations, and demographic experience. Actuarial assumptions were last reviewed in conjunction with the July 1, 2007 through June 30, 2011 4-Year Experience Study dated March 30, 2012.

---------- *Economic Assumptions* ----------

The economic assumptions were adopted by the Board on July 19, 2012 to be first effective for the June 30, 2012 valuation.

The investment return rate used in the valuations was 8.0% per year, compounded annually (net after investment expenses). This assumption is used to account for the fact that equal amounts of money payable at different points in time in the future do not have the same value presently.

Pay increase assumptions for individual active members are shown for sample ages on page 8. Part of the assumption for each age is for merit and/or seniority increase, and the other 3.0% recognizes wage inflation. This assumption is used to project a member's current salary to the salaries upon which benefits will be based.

The active member payroll is assumed to increase 3.0% annually, which is the portion of the individual pay increase assumptions attributable to wage inflation.

The annual Cost-of-Living Adjustment (COLA) is assumed to be 4.00%, on a compounded basis, when a minimum COLA of 4% is in effect (4.0% for 12 years, 3.06% the next year to reach a cumulative 65% followed by 2.0%). When no minimum COLA is in effect, price inflation is assumed to be 2.5% and the annual COLA is assumed to be 2.0% (80% of 2.5%), on a compounded basis.

---------- *Non-Economic Assumptions* ----------

The demographic assumptions were adopted by the Board on June 20, 2012 to be first effective for the June 30, 2012 valuation.

The mortality table, for post-retirement mortality, used in evaluating allowances to be paid was the RP 2000 combined healthy mortality table, projected to 2016 with Scale AA. Related values are shown on page 9. This assumption is used to measure the probabilities of each benefit payment being made after retirement. The pre-retirement mortality rates used were 100% of the post-retirement mortality rates for males and 80% of the post-retirement mortality for females.

The mortality tables include a margin of 15% for men and 17% for women for mortality improvements based on the four-year experience study from June 30, 2007 to June 30, 2011.

Summary of Assumptions Used
for the June 30, 2015 Actuarial Valuation

The probabilities of age and service retirement are shown on page 10. It was assumed that each member will be granted one half year (4 months for 2011 plan members) of service credit for unused leave upon retirement and military service purchases.

The probabilities of withdrawal from service, disability and death-in-service are shown for sample ages on page 8. For disability retirement, impaired longevity was recognized by use of special mortality tables.

The entry age normal actuarial cost method of valuation was used in determining liabilities and normal cost. Each member's normal cost was based on the benefit provisions applicable to that member. The normal cost is projected to the applicable fiscal year. Differences in the past between assumed experience and actuarial experience ("actuarial gains and losses") become part of actuarial accrued liabilities. Unfunded actuarial accrued liabilities are amortized to produce payments, (principal & interest) which are level percents of payroll contributions.

The amortization of the unfunded actuarial accrued liability is based on a closed 30-year amortization period, level percent of payroll amortization as adopted by the Board. This method was first effective with the June 30, 2014 valuation. As of June 30, 2015 valuation, 29 years remain. The amortization is based on the projected unfunded actuarial accrued liability to the beginning of the fiscal year during which the contributions are expected to be made.

Employer contribution dollars were assumed to be ***paid in equal installments*** throughout the employer's fiscal year.

Actuarial value of assets. Valuation assets recognize assumed investment return fully each year. Differences between actual and assumed investment return are phased-in over an open three-year period. Valuation assets are not permitted to deviate from the market value by less than 80% or more than 125%.

The data about persons now covered and about present assets were furnished by the System's administrative staff. Although examined for general reasonableness, the data was not audited by the Actuary.

The liabilities for active members hired on or after January 1, 2011 were based on MSEP 2011 benefits. The liabilities for active members hired on or after July 1, 2000 (April 26, 2005 for administrative law judges) were based on MSEP 2000 benefits. The liabilities for active members hired before July 1, 2000 for Elected Officials, General Assembly, and Uniformed Water Patrol were based on MSEP benefits. The liabilities for all other active members hired before July 1, 2000 were based on the assumption that members would elect MSEP 2000 prior to age 62 and MSEP on or after age 62.

For members on long-term disability, the actuarial accrued liability is the present value of benefits under active assumptions plus the difference of the present value of benefits with and without future pay growth to reflect indexing of pay in ultimate retirement benefits.

The actuarial valuation computations were made by or under the supervision of Brad Lee Armstrong and David T. Kausch who are Members of the American Academy of Actuaries (MAAA).

Separations from Active Employment before Service Retirement and Individual Pay Increase Assumptions as of June 30, 2015

		Percent of Active Members ------ Separating within the Next Year -----						Pay Increase Assumptions -- For An Individual Employee --		
Sample	Years of	Withdrawal ***		Death*		Disability		Merit &	Base	Increase
Ages	Service	Men	Women	Men	Women	Men	Women	Seniority**	(Economy)	Next Year
	0	23.0 %	26.9 %							
	1	18.0	20.5							
	2	15.0	15.4							
	3	13.0	12.5							
	4	11.0	10.9							
25	5+	13.0	13.3	0.03 %	0.01 %	0.17 %	0.30 %	2.9 %	3.0 %	5.9 %
30		10.2	10.5	0.04	0.02	0.17	0.30	2.2	3.0	5.2
35		7.9	8.1	0.07	0.03	0.21	0.30	1.6	3.0	4.6
40		5.6	5.7	0.09	0.04	0.26	0.32	1.2	3.0	4.2
45		4.2	4.3	0.12	0.07	0.34	0.38	0.9	3.0	3.9
50		2.8	2.9	0.16	0.10	0.49	0.57	0.7	3.0	3.7
55		2.8	2.9	0.27	0.19	1.07	0.89	0.5	3.0	3.5
60		2.8	2.9	0.52	0.37	1.50	1.50	0.4	3.0	3.4
65		2.8	2.9	1.02	0.72	1.60	1.70	0.3	3.0	3.3
70		2.8	2.9	1.74	1.24	1.60	1.70	0.2	3.0	3.2

* *2% of the deaths in active service are assumed to be duty related.*
** *Does not apply to members of the General Assembly.*
*** *Does not apply to Elected Officials and Legislators.*

Elected Officials and Legislators

Percent of Active Members Separating within the Next Year

Years of Service	Withdrawal Male/Female
1	8.0 %
2	8.0
3	8.0
4	8.0
5	12.0
6	12.0
7	12.0
8+	35.0

Post-Retirement Mortality Rates

The mortality tables were the RP 2000 mortality tables, projected to 2016 with Scale AA, including a margin of 15% for men and 17% for women for mortality improvements. Disabled mortality tables are the healthy mortality tables set forward 10 years. The pre-retirement mortality rates used were 100% of the post-retirement mortality rates for males and 80% of the post-retirement mortality for females.

	Service		Disability	
Age	Men	Women	Men	Women
45	0.0012	0.0009	0.0027	0.0024
50	0.0016	0.0013	0.0052	0.0047
55	0.0027	0.0024	0.0102	0.0090
60	0.0052	0.0047	0.0174	0.0155
65	0.0102	0.0090	0.0302	0.0247
70	0.0174	0.0155	0.0548	0.0410
75	0.0302	0.0247	0.0990	0.0703
80	0.0548	0.0410	0.1720	0.1255
85	0.0990	0.0703	0.2591	0.1884

Retirement Values
June 30, 2015

Sample Attained Ages	Present Value of $1/Month the First Year (with 50% Joint & Survivor) Increasing 4.0% / 2.0% Yearly				Present Value of $1/Month the First Year Increasing 2.0% Yearly			
	Service		Disability		Service		Disability	
	Men	Women	Men	Women	Men	Women	Men	Women
40	$224.11	$224.12	$212.76	$211.89	$184.40	$186.75	$169.01	$172.32
45	217.22	217.01	202.65	201.39	177.68	180.43	157.94	162.08
50	208.28	207.81	190.14	188.39	169.01	172.32	144.49	149.76
55	196.76	196.07	175.18	172.83	157.94	162.08	128.94	135.56
60	182.48	181.61	157.88	154.80	144.49	149.76	111.76	119.87
65	165.46	164.49	138.11	134.44	128.94	135.56	92.72	102.82
70	145.94	144.91	116.94	112.03	111.76	119.87	73.10	84.62
75	123.90	123.17	96.04	88.83	92.72	102.82	55.15	66.19
80	100.55	100.10	76.52	68.15	73.10	84.62	40.28	50.49
85	78.09	77.41	59.89	52.82	55.15	66.19	30.32	40.10

Sample Attained Ages	Future Life Expectancy (Years)			
	Service		Disability	
	Men	Women	Men	Women
40	41.95	44.10	32.39	34.43
45	37.15	39.24	27.68	29.69
50	32.39	34.43	23.13	25.13
55	27.68	29.69	18.87	20.84
60	23.13	25.13	14.96	16.90
65	18.87	20.84	11.39	13.32
70	14.96	16.90	8.29	10.12
75	11.39	13.32	5.83	7.37
80	8.29	10.12	4.03	5.31
85	5.83	7.37	2.91	4.05

Percent of Eligible Active Members Retiring Next Year

Normal Retirement Pattern					Early Retirement Pattern		
	MSEP and MSEP 2000*			MSEP 2011**		MSEP and MSEP 2000*	MSEP 2011**
Retirement Age	Percent Eligible			Percent Eligible	Retirement Age	Percent Eligible	Percent Eligible
	1st Year	2nd Year	3rd Year				
48	22%						
49	22	10%					
50	22	10	21%				
51	22	10	21				
52	22	10	21				
53	22	10	18				
54	22	10	18				
55	22	12	26	45%			
56	22	12	25	45			
57	22	12	22	35	57	2.5%	
58	22	12	22	35	58	3.5	
59	22	12	20	30	59	3.5	
60	21	12	22	35	60	5.0	
61	20	12	20	25	61	6.0	
62	19	22	30	40	62	6.0	10%
63	15	18	25	30	63	6.0	10
64	15	20	17	20	64	6.0	10
65	20	20	27	30	65	6.0	50
66	22	20	26	25	66	6.0	50
67	15	25	22	20	67	6.0	
68	15	20	22	20	68	6.0	
69	15	20	22	20	69	6.0	
70	25	20	22	20	70	6.0	
71	25	20	22	20	71	6.0	
72	25	20	22	20	72	6.0	
73	25	20	22	20	73	6.0	
74	25	20	22	20	74	6.0	
75	50	50	22	50	75	6.0	
76	50	50	22	50	76	6.0	
77	75	75	22	75	77	6.0	
78	100	100	100	100	78	100.0	

* *For members hired prior to January 1, 2011.*
** *For members hired on or after January 1, 2011.*