

February 28, 2013

Mr. Stephen G. Olish  
Executive Director  
Police Retirement System of St. Louis  
2020 Market Street  
St. Louis, MO 63103

**Re: 2013 Legislative Cost Study - Revised**

Dear Steve:

As requested, we have estimated the impact of the proposed legislative changes for the Police Retirement System of St. Louis. The results of our analysis are contained in this revised letter. The proposed changes are divided into three types, depending upon the group being affected:

- (A) Changes that only affect members hired after the effective date of the legislation
- (B) Changes that affect active (non-vested) members at the time of the effective date of the legislation.
- (C) Changes affecting the entire system

We will discuss and present financial implications for each of these.

#### **A. Members Hired After the Effective Date of Legislation**

For members hired after the effective date of the legislation, we understand the changes to be:

1. Minimum service retirement increased from 20 to 25 years, with benefit payment deferred to minimum retirement age 50, or an actuarially-reduced benefit if taken before age 50.
2. Three-year Final Average Compensation (FAC).
3. Member contribution of 9%, with 50% lump sum return of contributions upon retirement.
  - a. Members who separate with less than five (5) years of service receive a return of their contribution, without interest, based on the following graduated scale:
    - i. Less than one (1) year – five (5%) percent of contribution returned;
    - ii. Less than two (2) years, but more than one year – ten (10%) percent of contribution returned;
    - iii. Less than three (3) years, but more than two years – fifteen (15%) percent of contribution returned;
    - iv. Less than four (4) years, but more than three years – twenty (20%) percent of contribution returned;
    - v. Less than five (5) years, but more than four years – twenty-five (25%) percent of contribution returned.



- b. Members, who separate with more than five (5) years, but less than twenty-five (25) years, receive a full refund of contributions with interest earned at a rate equal to the rate of the 10-year Treasury bill plus 1%, not to exceed 6%.
- 4. No re-entry from DROP – The DROP interest rate would be equal to the rate of the 10-year Treasury bill plus 1%, not to exceed 6%.
- 5. Maximum service retirement benefit reduced to 70% of FAC.
- 6. Maximum cumulative cost-of-living allowance (COLA) increases for retirees hired after the effective date of the legislation and their surviving spouses reduced to 25%.

Since these changes only impact members hired after the effective date of the legislation, there is no impact on the System’s current Normal Cost under the Aggregate method. In the table below, we estimate the cost impact for the six changes cumulatively, by showing what the Entry Age Normal Cost percentage would be based on the 2012 valuation data if the changes were already in effect for current members. The use of Entry Age Normal is used so that the effects of the change are only applied for new entrants.

<b><u>Proposed Changes for Members Hired After the Legislation Effective Date</u></b>				
	<b><u>EAN</u></b>	<b><u>Member</u></b>	<b><u>Employer</u></b>	<b><u>Cumulative</u></b>
	<b><u>Gross</u></b>	<b><u>Contribution</u></b>	<b><u>NC %</u></b>	<b><u>Chg</u></b>
	<b><u>NC %</u></b>	<b><u>%</u></b>		
<b>2012 Baseline</b>	<b>20.82%</b>	<b>7.00%</b>	<b>13.82%</b>	
<b>(1) Increase Service Requirement</b>	<b>19.26%</b>	<b>7.00%</b>	<b>12.26%</b>	<b>-1.56%</b>
<b>(2) 3-Year FAC</b>	<b>19.03%</b>	<b>7.00%</b>	<b>12.03%</b>	<b>-1.79%</b>
<b>(3) 9% Member Contribution</b>	<b>18.20%</b>	<b>9.00%</b>	<b>9.20%</b>	<b>-4.62%</b>
<b>(4) No DROP Re-Entry</b>	<b>17.69%</b>	<b>9.00%</b>	<b>8.69%</b>	<b>-5.13%</b>
<b>(5) Service Retirement 70% of FAC</b>	<b>17.60%</b>	<b>9.00%</b>	<b>8.60%</b>	<b>-5.22%</b>
<b>(6) 25% Maximum COLA</b>	<b>17.48%</b>	<b>9.00%</b>	<b>8.48%</b>	<b>-5.34%</b>

Below we show a 20-year projection of the impact on the Aggregate Normal Cost in dollars. The projection assumes 3% annual growth in total payroll. As payroll for current members declines over time, the impact of the changes for new hires gradually increases.

<b>20-Year Projection</b>			
<b>Aggregate Normal Cost Impact (EOY)</b>			
<b>Proposed Changes for New Hires</b>			
(\$ in millions)			
<u>Year</u>	<u>NC before changes</u>	<u>NC after changes</u>	<u>Difference</u>
1	\$32.6	\$32.6	\$0.0
2	\$33.6	\$33.5	(\$0.1)
3	\$33.3	\$33.0	(\$0.3)
4	\$33.2	\$32.7	(\$0.5)
5	\$31.6	\$30.7	(\$0.9)
6	\$30.8	\$29.7	(\$1.1)
7	\$30.0	\$28.7	(\$1.3)
8	\$29.3	\$27.7	(\$1.6)
9	\$28.7	\$26.9	(\$1.8)
10	\$28.1	\$26.1	(\$2.0)
11	\$27.5	\$25.4	(\$2.1)
12	\$27.1	\$24.6	(\$2.5)
13	\$26.6	\$23.9	(\$2.7)
14	\$26.2	\$23.3	(\$2.9)
15	\$25.9	\$22.7	(\$3.2)
16	\$25.6	\$22.1	(\$3.5)
17	\$25.4	\$21.6	(\$3.8)
18	\$25.2	\$20.9	(\$4.3)
19	\$25.0	\$20.4	(\$4.6)
20	\$24.9	\$20.0	(\$4.9)

### **B. Active (Non-Vested) Members at Time of Effective Date of Legislation**

For active (non-vested) members at the time of the effective date of the legislation, we understand the change to be:

1. Increase member contribution to 9%, with full return of contribution upon retirement, or with full amount at separation (not retirement) with interest earned at a rate equal to the 10-year Treasury bill rate plus 1%, not to exceed 6%.

In the two tables below we show the impact on the Aggregate Normal Cost percentage for the current valuation, and a projection of the impact over the next 20 years.

<b><u>Proposed Changes for Active (Non-Vested) Members at Legislation Effective Date</u></b>		
	<b><u>Aggregate Normal Cost %</u></b>	<b><u>Cumulative Change</u></b>
2012 Baseline	43.06%	
(1) 9% Member Contribution	42.48%	-0.58%

<b>20-Year Projection</b>			
<b>Aggregate Normal Cost Impact (EOY)</b>			
<b>Proposed Change for Active (Non-Vested) Members</b>			
<b>(\$ in millions)</b>			
<u>Year</u>	<u>NC before changes</u>	<u>NC after changes</u>	<u>Difference</u>
1	\$32.6	\$32.2	(\$0.4)
2	\$33.6	\$33.1	(\$0.5)
3	\$33.3	\$32.7	(\$0.6)
4	\$33.2	\$32.6	(\$0.6)
5	\$31.6	\$30.9	(\$0.7)
6	\$30.8	\$30.0	(\$0.8)
7	\$30.0	\$29.2	(\$0.8)
8	\$29.3	\$28.4	(\$0.9)
9	\$28.7	\$27.7	(\$1.0)
10	\$28.1	\$27.0	(\$1.1)
11	\$27.5	\$26.4	(\$1.1)
12	\$27.1	\$25.9	(\$1.2)
13	\$26.6	\$25.4	(\$1.2)
14	\$26.2	\$24.9	(\$1.3)
15	\$25.9	\$24.5	(\$1.4)
16	\$25.6	\$24.2	(\$1.4)
17	\$25.4	\$23.9	(\$1.5)
18	\$25.2	\$23.6	(\$1.6)
19	\$25.0	\$23.4	(\$1.6)
20	\$24.9	\$23.2	(\$1.7)

### C. Entire System

For the entire System, we understand the changes to be:

1. Change the DROP interest rate to a rate that equals a 10-year Treasury bill rate plus 1%, not to exceed 6%, allowing vested members a one-time option to choose either this formula or the rate of the System's market return.
2. Reducing vesting for Ordinary Disability from 10 years to 5 years of service.
3. Adoption of the "Kansas City Model" for disability applications.
4. Switch to EAN cost method of valuation for the System.

Our analysis of these changes is as follows:

1. **Change the DROP interest rate and offer vested members a one-time option, and**
2. **Reduce vesting for Ordinary Disability**

With 10-year Treasury rates currently in the range of 2%, it does not appear likely that many vested members would choose the 10-year Treasury rate + 1% over the market rate of return on the System’s assets, so our analysis only applies savings to non-vested members. In the tables below we show the impact of these two changes on the System’s Aggregate Normal Cost percentage, as well as a projection of the impact over the next 20 years.

<b><u>Proposed Changes for Entire System</u></b>		
	<b><u>Aggregate Normal Cost %</u></b>	<b><u>Cumulative Change</u></b>
<b>2012 Baseline</b>	<b>43.06%</b>	
<b>(1) Reduce DROP Crediting Rate</b>	<b>42.77%</b>	<b>-0.29%</b>
<b>(2) Reduce Ordinary Disability Vesting</b>	<b>42.81%</b>	<b>-0.25%</b>

<b>20-Year Projection</b>			
<b>Aggregate Normal Cost Impact (EOY)</b>			
<b>Proposed Changes for Entire System</b>			
<b>(\$ in millions)</b>			
<b><u>Year</u></b>	<b><u>NC before changes</u></b>	<b><u>NC after changes</u></b>	<b><u>Difference</u></b>
1	\$32.6	\$32.4	(\$0.2)
2	\$33.6	\$33.4	(\$0.2)
3	\$33.3	\$33.1	(\$0.2)
4	\$33.2	\$33.1	(\$0.1)
5	\$31.6	\$31.4	(\$0.2)
6	\$30.8	\$30.6	(\$0.2)
7	\$30.0	\$29.9	(\$0.1)
8	\$29.3	\$29.2	(\$0.1)
9	\$28.7	\$28.5	(\$0.2)
10	\$28.1	\$27.9	(\$0.2)
11	\$27.5	\$27.4	(\$0.1)
12	\$27.1	\$26.9	(\$0.2)
13	\$26.6	\$26.5	(\$0.1)
14	\$26.2	\$26.1	(\$0.1)
15	\$25.9	\$25.8	(\$0.1)
16	\$25.6	\$25.5	(\$0.1)
17	\$25.4	\$25.3	(\$0.1)
18	\$25.2	\$25.1	(\$0.1)
19	\$25.0	\$24.9	(\$0.1)
20	\$24.9	\$24.8	(\$0.1)

**3. Adopt the “Kansas City Model” for disability applications**

Based on discussions with System staff, it is our understanding that this change is not expected to significantly impact the number or type of disabilities, and is therefore not expected to have a significant impact on the System’s costs.

#### 4. Switch to the EAN cost method

With the Aggregate Method, the entire current year cost of the plan is allocated to Normal Cost. In switching to the Entry Age Normal (EAN) actuarial cost method, there will be an annual calculation of an actuarial liability (AL) and a normal cost. The unfunded actuarial liability (UAL) will be the excess (or surplus) of the actuarial liability over the actuarial value of assets. In adopting EAN, the System will need to adopt an amortization policy for the UAL. The following are the elements involved in an amortization policy:

- Fixed, layered or rolling periods.
  - Fixed period: When the UAL is first established, a period is selected for amortizing the UAL. All subsequent changes in the UAL are also amortized to this fixed period. Over time, the period becomes shorter and shorter, which may increase contribution volatility.
  - Layered periods: This is the same as the fixed period at the beginning. However, after the first valuation, each subsequent change in UAL is amortized over its own fixed period. This eliminates the volatility issue with a fixed period for the entire UAL.
  - Rolling period: With a rolling period, the UAL is re-amortized each year over a new amortization period. No portion of the UAL ever becomes fully amortized.
- Level percent of pay or level dollar amortization.
  - Level percent of pay: The amortization payments are determined as a level percentage of future pay, based upon the assumption used in the valuation. Therefore, payments increase over time. In the early years, there is a possibility that amortization payments may not cover interest on the UAL, but this tends not to be a problem if the amortization period is fixed or layered. The advantage of this approach is that it develops contributions which would be a level percentage of payroll if all actuarial assumptions are realized.
  - Level dollar: The amortization payments are determined as level dollar amounts, which will develop contributions which are expected to be a decreasing percentage of payroll.
- Amortization period: Under GASB Statement No. 25, an amortization period of up to 30 years was permitted. Current actuarial best practice would say that periods of from 15 to 20 years would be more reasonable.

Our recommendation would be to use layered payments, determined as a level percentage of payroll, over periods of either 15 or 20 years. The tables below show the results under each of these alternatives. At the upcoming meeting, we will be able to display all the potential permutations for your consideration using our P-Scan software.

First, we show the impact of a 15-year layered amortization of the UAL, with payments as a level percent of pay (with a 3% payroll growth assumption). At the end of the projection period, the funded percentage is 100%, compared to 93% under the Aggregate method.

<b>20-Year Projection</b>					
<b>Estimated Cost Impact (EOY)</b>					
<b>Switch to Entry Age Normal (EAN) Cost Method</b>					
<b>15-Year Layered UAL Amortization</b>					
(\$ in millions)					
<u>Year</u>	<u>Aggregate Cost</u>	<u>EAN NC</u>	<u>EAN UAL</u>	<u>Total EAN</u>	<u>Difference</u>
1	\$32.6	\$8.3	\$18.4	\$26.8	(\$5.8)
2	\$33.6	\$8.6	\$20.4	\$29.0	(\$4.6)
3	\$33.3	\$8.8	\$21.5	\$30.4	(\$2.9)
4	\$33.2	\$9.1	\$22.9	\$32.0	(\$1.2)
5	\$31.6	\$9.4	\$23.0	\$32.4	\$0.8
6	\$30.8	\$9.7	\$23.8	\$33.4	\$2.6
7	\$30.0	\$10.0	\$24.5	\$34.4	\$4.4
8	\$29.3	\$10.3	\$25.2	\$35.5	\$6.2
9	\$28.7	\$10.6	\$26.0	\$36.5	\$7.8
10	\$28.1	\$10.9	\$26.7	\$37.6	\$9.5
11	\$27.5	\$11.2	\$27.5	\$38.7	\$11.2
12	\$27.1	\$11.5	\$28.4	\$39.9	\$12.8
13	\$26.6	\$11.9	\$29.2	\$41.1	\$14.5
14	\$26.2	\$12.2	\$30.1	\$42.3	\$16.1
15	\$25.9	\$12.6	\$31.0	\$43.6	\$17.7
16	\$25.6	\$13.0	\$3.2	\$16.2	(\$9.4)
17	\$25.4	\$13.4	\$1.0	\$14.4	(\$11.0)
18	\$25.2	\$13.8	\$0.3	\$14.1	(\$11.1)
19	\$25.0	\$14.2	(\$0.8)	\$13.4	(\$11.6)
20	\$24.9	\$14.6	\$0.0	\$14.7	(\$10.2)

Second, we show the impact of a 20-year layered amortization of the UAL, also with payments as a level percent of pay (with a 3% payroll growth assumption). Like the previous scenario, the funded percentage at the end of the projection period is 100%.

<b>20-Year Projection</b>					
<b>Estimated Cost Impact (EOY)</b>					
<b>Switch to Entry Age Normal (EAN) Cost Method</b>					
<b>20-Year Layered UAL Amortization</b>					
(\$ in millions)					
<u>Year</u>	<u>Aggregate Cost</u>	<u>EAN NC</u>	<u>EAN UAL</u>	<u>Total EAN</u>	<u>Difference</u>
1	\$32.6	\$8.3	\$15.2	\$23.6	(\$9.0)
2	\$33.6	\$8.6	\$16.9	\$25.5	(\$8.1)
3	\$33.3	\$8.8	\$17.8	\$26.7	(\$6.6)
4	\$33.2	\$9.1	\$18.9	\$28.1	(\$5.1)
5	\$31.6	\$9.4	\$19.1	\$28.4	(\$3.2)
6	\$30.8	\$9.7	\$19.7	\$29.3	(\$1.5)
7	\$30.0	\$10.0	\$20.2	\$30.2	\$0.2
8	\$29.3	\$10.3	\$20.9	\$31.1	\$1.8
9	\$28.7	\$10.6	\$21.5	\$32.0	\$3.3
10	\$28.1	\$10.9	\$22.1	\$33.0	\$4.9
11	\$27.5	\$11.2	\$22.8	\$34.0	\$6.5
12	\$27.1	\$11.5	\$23.5	\$35.0	\$7.9
13	\$26.6	\$11.9	\$24.2	\$36.1	\$9.5
14	\$26.2	\$12.2	\$24.9	\$37.1	\$10.9
15	\$25.9	\$12.6	\$25.6	\$38.2	\$12.3
16	\$25.6	\$13.0	\$26.4	\$39.4	\$13.8
17	\$25.4	\$13.4	\$27.2	\$40.6	\$15.2
18	\$25.2	\$13.8	\$28.0	\$41.8	\$16.6
19	\$25.0	\$14.2	\$28.9	\$43.0	\$18.0
20	\$24.9	\$14.6	\$29.7	\$44.3	\$19.4

### Certification

With the exception of the proposed legislative changes described above, the calculations in this letter were performed based on the provisions of Sections 86.200 to 86.366 of the Revised Statutes of Missouri as amended through February 2013.

In preparing our letter, we relied on information (some oral and some written) supplied by System staff. This information includes, but is not limited to, plan provisions, employee data, financial data, and information on the 2013 legislative package. We performed an informal examination of the obvious characteristics of the data for reasonableness and consistency in accordance with Actuarial Standard of Practice No. 23.

To the best of our knowledge, this letter and its contents have been prepared in accordance with generally recognized and accepted actuarial principles and practices which are consistent with the Code of Professional Conduct and applicable Actuarial Standards of



Mr. Stephen G. Olish

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Practice set out by the Actuarial Standards Board. Furthermore, as credentialed actuaries, we meet the Qualification Standards of the American Academy of Actuaries to render the opinion contained in this letter. This report does not address any contractual or legal issues. We are not attorneys and our firm does not provide any legal services or advice.

Finally, this letter was prepared exclusively for the Police Retirement System of St. Louis for the purpose described herein. This letter is not intended to benefit any third party, and Cheiron assumes no duty or liability to any such party.

If you have any questions, please do not hesitate to contact us.

Sincerely,  
Cheiron



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