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July 1, 2012 Actuarial Review
of the Retirement Systems under the
**Minnesota Legislative Commission
on Pensions and Retirement**

February 19, 2013

Prepared by:

Milliman, Inc.

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ATTN: Mr. Lawrence A. Martin, Executive Director

RE: Actuarial Review of the July 1, 2012 Actuarial Valuation Reports

Ladies and Gentlemen:

The enclosed report presents the findings and comments resulting from a review of the July 1, 2012 actuarial valuations for selected funds of the retirement systems administered by the Duluth Teachers Retirement Fund Association (DTRFA), the Minnesota Public Employees Retirement Association (PERA), the Minnesota State Retirement System (MSRS), the Minnesota Teachers Retirement Association (TRA), and the St. Paul Teachers Retirement Association (StPTRFA). The funds included in the Actuarial Review are detailed below. An overview of our major findings is included in the Executive Summary section of the report. More detailed commentary is provided in the sections devoted to each fund individually.

We pursued this review with a constructive mindset. We looked to identify any possible suggestions that might improve understanding of or confidence in the actuarial services being provided. Naturally, some of the comments may be viewed as personal preference or nit-picky in nature. While we are not trying to impose our own preferences or biases on the Fund or the Fund Actuary, neither did we hesitate to make such comments if we believed that some change, however minor, would improve the actuarial functions.

This report is prepared for use by the Minnesota Legislative Commission on Pensions and Retirement (LCPR) in their appropriate oversight role with regard to the above mentioned retirement systems. It has been prepared using multi-faceted review techniques. These techniques include specific validation of a sampling of calculations.

Actuarial Review of July 1, 2012 Actuarial Valuation Report

Funds Included in Review *	Funds Excluded from Review
MSRS General	MSRS Correctional
MSRS State Patrol	MSRS Legislators
PERA General	MSRS Elective Officials
PERA Police and Fire	MSRS Judges
PERA MERF	PERA Local Correctional
TRA	
DTRFA	
St. PTRFA	

* A complete replication of the July 1, 2012 Actuarial Valuation has been performed for DTRFA and St. PTRFA. Please see the Milliman client report dated January 7, 2013 for the St.PTRFA report and January 24, 2013 for the DTRFA report for the details of the replication valuations. For all of the other funds included in the Actuarial Review, a complete replication of the July 1, 2012 actuarial valuation has not been performed.

In preparing this report, we relied, without audit, on information (some oral and some in writing) supplied by both the relevant actuarial firms who prepare the formal valuations and the relevant staff at each of the administrative systems. This information includes, but is not limited to, statutory provisions, employee data and financial information. It should be noted that if any data or other information provided to us is inaccurate or incomplete, our calculations and recommendations may need to be revised.

On the basis of the foregoing, we hereby certify that, to the best of our knowledge and belief, this report is complete and accurate and has been prepared in accordance with generally recognized and accepted actuarial principles and practices which are consistent with the principles prescribed by the Actuarial Standards Board (ASB) and the Code of Professional Conduct and Qualification Standards for Public Statements of Actuarial Opinion of the American Academy of Actuaries.

Any distribution of the enclosed report must be in its entirety including this cover letter, unless prior written consent is obtained from Milliman, Inc. This report has been prepared in accordance with the terms and provisions of the Consulting Services Agreement effective September 26, 2011.

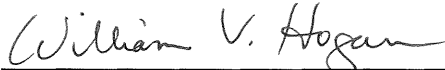
I, William V. Hogan, FSA, am an actuary for Milliman, Inc. I am a member of the American Academy of Actuaries and a Fellow of the Society of Actuaries, and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

I, Timothy J. Herman, FSA, am an actuary for Milliman, Inc. I am a member of the American Academy of Actuaries and a Fellow of the Society of Actuaries, and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

We look forward to making a personal presentation of our findings in briefings to the Minnesota Legislative Commission on Pensions and Retirement and to relevant staff members.

Respectfully submitted,

Milliman, Inc.



William V. Hogan, FSA, MAAA
Principal and Consulting Actuary



Timothy J. Herman, FSA, MAAA
Principal and Consulting Actuary

WVH/TJH/cw

**July 1, 2012 Actuarial Review
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Section 1: Executive Summary

Purpose and Scope of the Actuarial Audit Review

In accordance with Minnesota Statutes, Section 356.214, Subdivision 4, the Minnesota Legislative Commission on Pensions and Retirement (LCPR) has engaged Milliman, Inc. to perform an actuarial review of the July 1, 2012 actuarial valuations prepared for selected statewide and major local Minnesota public employee pension funds. Except as indicated below, our reviews have been limited in scope and do not reflect a full replication of any individual retirement system. The table below details the selected funds included in our review.

Funds Included in Review *	Funds Excluded from Review
MSRS General	MSRS Correctional
MSRS State Patrol	MSRS Legislators
PERA General	MSRS Elective Officials
PERA Police and Fire	MSRS Judges
PERA MERF	PERA Local Correctional
TRA	
DTRFA	
St. PTRFA	

* A complete replication of the July 1, 2012 Actuarial Valuation has been performed for DTRFA and St. PTRFA. Please see the Milliman client report dated January 7, 2013 for the St. PTRFA report and January 24, 2013 for the DTRFA report for the details of the replication valuations. For all of the other funds included in the Actuarial Review, a complete replication of the July 1, 2012 actuarial valuation has not been performed.

The actuarial review of each of the remaining valuations was performed using a methodology known as a “limited scope” or “peer review” audit. Such a review is intended to provide assurance that the liabilities and costs of the system are reasonable. The review is not a full replication of the actuarial valuation results, but is a review of the key components in the valuation process that encompass the derivation of the liabilities and costs for the system. These key components are the data, the benefits valued, application of the actuarial assumptions, application of the asset valuation method and the actuarial cost method employed. The receipt of detailed valuation output for a select group of test lives provides the detail necessary to validate each of these key components. The test lives reviewed are not randomly selected, but rather are specifically chosen to include members that will cover the various benefit provisions and actuarial assumptions used in the valuation process. For example, test lives generally will include:

- Members in various status categories such as active, terminated vested, retired, and survivors.
- Retiree test lives are selected with different forms of payment to ensure all payment forms are accurately valued.
- Active members who are covered by different benefit structures are included to make sure the benefits valued for all benefit structures are appropriate.
- Members of different gender and age/service combinations to test the application of different actuarial assumptions.
- Active members are selected that will test differences within one set of actuarial assumptions, e.g. Rule of 90, early retirement and normal retirement.

We reviewed all of the information provided to us from the fund administrators and the fund actuaries. We also requested and reviewed additional information provided by the fund actuaries. With respect to the actuarial assumptions, we generally focused our review on the application of the assumptions in the valuation process. In some limited instances, we have commented about the appropriateness of some assumptions.

A limited scope audit may identify areas of concern, but it generally cannot quantify the impact of any issues identified, other than in general terms. In our report, we comment on several findings where we feel the issue identified is immaterial or within a reasonable degree of tolerance. For the most part, these comments are couched in terms of an expected percentage impact on the actuarial liability and normal cost rate. Given that the actuarial accrued liability of some of the plans is a very large number, a small percent change may result in a dollar amount judged to be "large" depending upon your point of view (0.50% of \$23 billion is \$115 million). However, as a percentage, the difference may be considered small and within acceptable levels of variance.

It is important to recognize that the actuarial valuation process, while very sophisticated in its calculation methodology, is still an estimate of the financial value of benefits payable on contingent events, most of which occur many years into the future. As such, a considerable amount of uncertainty and variability surrounds those estimates. As actuaries we recognize this fact and are comfortable that small differences (in percentages) in the results do not change the overall financial results portrayed in the valuation. Furthermore, the actuarial software used by different firms has implicit differences that create differences in the valuation numbers. A good example of differences in actuarial software is the decrement timing (mid-year vs. beginning of year). In this case both approaches fall within acceptable actuarial practices and both approaches produce reasonable results even though they may vary by several percentage points. For this reason, we believe the comparison of valuation results should be evaluated in terms of percentage differences. To provide some context for our comments, in a replication audit, where the differences that are identified can also be quantified, we generally expect to be within 1-2% on the calculation of the present value of future benefits and within 4-5% on the calculation of the actuarial accrued liability and normal cost. The wider range on the latter items is because there tends to be more variability in how different actuarial software programs allocate the total liability (present value of future benefits) to past and future years of service.

Statement of Key Findings

Our conclusions concerning the primary issues of the audit are as follows:

In general, we have found the actuarial calculations to be accurate, appropriate, and consistent with the standards of work issued by the LCPR. While there are some exceptions noted throughout this report, we do not believe that any of these would substantively alter the results presented by the various fund actuaries. However, in our conclusions, we present some longer term considerations where we have some concerns.

There are several issues identified for one or more systems in the report. We have summarized some of them as follows:

1. The 2012 Omnibus Retirement Bill included reductions in both the interest rate and payroll growth rate assumptions. The interest rate was changed from 8.5% to 8.0% for the period July 1, 2012 through June 30, 2017, and 8.50% thereafter. The impact of the decrease in the interest rate assumption is to increase the Fund Actuaries' calculation of plan liabilities and costs. The changes to the payroll growth assumption vary by Fund. The impact of the decrease in the payroll growth assumption combined with the decrease in the interest rate assumption results in a higher calculated amortization payment on the Unfunded Actuarial Accrued Liability. Funded ratios and the contribution sufficiency/(deficiency) measure have declined due to these assumption changes.

2. Due to mixed investment experience for the last four fiscal years, most of the funds using an asset smoothing mechanism continue to have actuarial value of assets approximately equal to the market value of assets. However, it should be noted that an investment loss is generally reported by most funds when looking at the change in actuarial value of assets since the last valuation and is due to unfavorable investment experience for the last fiscal year. While significant funding challenges remain, the Fund Actuary's results when viewed on an actuarial value of assets basis are similar to the results on a market value basis. Consequently, we have focused our review and comments on the current funded status on an actuarial value of assets basis.
3. Duluth Teachers Retirement Fund Association and MSRS State Patrol have recently completed experience studies and revised assumptions. As noted in last year's review, the three statewide general employee funds, PERA Police & Fire, MERF Division of PERA, and STPTRFA use actuarial assumptions that are based on recently completed experience studies. In most cases, the result of the revised actuarial assumptions is a decrease of the funding ratios and the contribution sufficiency/(deficiency) measure. The table below compares the July 1, 2011 and July 1, 2012 contribution sufficiency/(deficiency) measures as calculated by the Fund Actuaries.

**Contribution Sufficiency/(Deficiency) Measure
Reported by Fund Actuary**

Fund*	July 1, 2011	July 1, 2012
MSRS General	-1.03%	-2.32%
MSRS Correctional	-5.30%	-4.58%
MSRS State Patrol	-5.25%	-11.52%
MSRS Judges	-5.17%	-13.50%
PERA General	0.03%	-0.96%
PERA Correctional	1.16%	0.13%
PERA P&F	-4.78%	-7.94%
TRA	-3.88%	-5.04%
DTRFA	-3.73%	-8.49%
SPTRFA	-2.27%	-6.40%

* The table above shows the results for Funds that use a level percentage of pay methodology to determine the Contribution Sufficiency/(Deficiency) measure. Consequently, the results for MSRS Elective State Officials, MSRS Legislators, and the MERF Division of PERA are not included.

4. For the Duluth Teachers Retirement Fund Association, there is an inherent upward bias in the calculation of the Actuarial Required Contribution rate due to the combined impact of the Fund Actuary's application of the Entry Age normal actuarial cost method and the amortization of the Unfunded Actuarial Accrued Liability as a level percentage of payroll for this fund. This issue is further discussed in Section 3 of this report. The Entry Age Normal methodology which is applied for Duluth Teachers lowers the Normal Cost and moves it to the unfunded actuarial liability. This increases the pressure of funding a mature fund such as Duluth Teachers during periods of declining payroll. Further, it is not clear to us that this method follows the Actuarial Standards of Practice as adopted by the LCPR. Under Minnesota Statutes, the Actuarial Required Contribution rate is not required to be contributed to the Fund. Instead, this measure is compared to the Statutorily Required Contributions to assess the adequacy of the current contributions. Using Milliman's replication results, the table below illustrates the differences in the calculation of the Contribution Sufficiency/Deficiency measure in dollar terms:

Duluth Teachers' Retirement Fund Association
Illustrative Contribution Sufficiency/(Deficiency) Measure Using Milliman Results

(dollars in thousands)

Entry Age Normal Method	Newly Hired Member's Benefit Structure	Each Member's Benefit Structure	Each Member's Benefit Structure
Amortization Method	Level Percent of Payroll	Level Percent of Payroll	Level Dollar
1. Statutory Contributions	\$7,348	\$7,348	\$7,348
2. Required Contributions			
a. Normal Cost	3,591	3,844	3,844
b. Amortization of the Unfunded Actuarial Accrued Liability	7,652	7,607	10,034
c. Expense	<u>587</u>	<u>587</u>	<u>587</u>
d. Total [2.a. + 2.b. + 2.c.]	11,830	12,038	14,465
Sufficiency/(Deficiency) [1.- 2.d.]	\$(4,482)	\$(4,690)	\$(7,117)

5. Legislation passed in both 2010 and 2011 modified the cost of living adjustments (COLA) applied to annual pension payments. These modifications lowered the COLA until a specified funding level is achieved. For the 2012 valuations, we have reviewed the methodology used by the Fund Actuary for determining the level of COLA to value in these situations. We believe the methodology used is reasonable for the 2012 valuations. However, we believe that there are issues that should be addressed before the July 1, 2013 actuarial valuations. For instance, as funds approach 90% funding, how should the threshold be determined? Is it 90% with the higher COLA or with the lower COLA. The PERA Correctional Fund has already encountered this issue. Upon achieving 90% in 2011, the higher COLA was valued in 2012. Upon valuing the higher COLA, the percentage has dropped below 90%. Next year, if the lower COLA is valued, will the ratio increase above 90% again? The other funds are not yet close enough to encounter this issue but the goal is that they will down the road. The Fund Actuary for PERA has recommended that this issue be addressed prior to the 2013 valuation, and we agree.
6. An important aspect of the actuarial reports is to provide a consistent "picture" of the funded status and funding requirements for each of the funds year after year. The current funded status as of the valuation date is extremely important but it is also important to understand the direction of the change in funded status. This understanding is enhanced when prior years can be compared in a consistent fashion. The following comments concerning report content are aimed in this direction.
 - We note that some of the reports do not show all of the decrement costs related to active member benefits even though the numbers accurately reflect those amounts in the totals. Specifically, in some cases, the expected refund payments have been aggregated with deferred retirement benefits for benefits expected to be paid to active members upon withdrawal.
 - Also, we note that the projected benefit ratio anticipates future increases in contributions which are already in statute for some funds, but not others. We think all fund actuaries should adopt a consistent methodology on this calculation.
7. An actuarial valuation is a snapshot of the current funded status as of the valuation date. It is important to understand the changes in funded status over time - both historical changes and expected future changes. We believe the valuation projections which are required by the actuarial

standards will provide useful information to the LCPR to more fully understand the funding challenges the retirement systems face.

There are other relatively minor items that we note in the individual report sections later on.

Conclusions and Recommendations

While the actuarial results presented in the reports are generally correct, we believe that there are some key issues facing most of these systems.

Actuarial Value of Assets

From the 7/1/2009 to the 7/1/2012 actuarial valuations, there have been significant changes to the benefit structure, updates to the actuarial assumptions, and modifications to the actuarial standards of practice adopted by the LCPR. In addition, when measured on a market value basis, the funds have experienced unfavorable asset return for the fiscal year ending June 30, 2012 and favorable asset returns for both the fiscal years ending June 30, 2010 and June 30, 2011 when compared to the 8.5% actuarial rate of asset return assumption specified by Minnesota statutes:

- The rates of return on a market value of assets basis were typically between 15-16% for the year ending June 30, 2010 with the MSRS Legislator's fund posting the lowest return at 12.2% and the Duluth Teachers Retirement Fund Association netting a return of 17.6%.
- The rates of return on a market value of assets basis were between 21-24% for the year ending June 30, 2011 with the Duluth Teachers Retirement Fund Association posting the lowest return at 21.6% and the St. Paul Teachers Retirement Fund Association netting a return of 24.8%.
- The rates of return on a market value of assets basis were ranged from a loss of 0.5% to positive return of 2.7% for the year ending June 30, 2012 with the St. Paul Teachers Retirement Fund Association posting the lowest return at (0.4%) and the PERA Police and Fire Fund Association netting a return of 2.9%.

The unfavorable market value returns for the year ending June 30, 2012 combined with the recognition of prior investment losses under the asset smoothing method, the July 1, 2012 actuarial valuation results indicate investment losses when measured on an actuarial value of assets.

COLA

One of the significant changes in the benefit structure made by the 2010 Omnibus Pension Legislation is the temporary reduction in the post-retirement Cost of Living Adjustment (COLA). This change requires a fund to pay a lower annual COLA until "financial stability" is restored for the fund. For most funds (but not all), the COLA is reduced from 2.5% to 2.0% per year. Minnesota statutes define "financial stability" to occur when the ratio of the market value of the fund's assets to the fund's actuarial accrued liabilities is 90% or more. If and when "financial stability" is reached as of an actuarial valuation date, the fund may pay a COLA of 2.5% as of the following January 1.

In setting the actuarial assumption with respect to "financial stability", some of the fund actuaries have prepared projections to determine if, and when, the fund is projected to reach the 90% funding level on a market value basis. For these funds, most of the projections indicate the fund will not reach the 90% funding level within the next 15 years in order to pay a higher COLA. Consequently, the actuarial valuations for these funds assume that the lower COLA required under the 2010 Omnibus Pension Legislation will continue to be paid for the actuarial valuation period (typically over the next 75-100 years for most actuarial valuation systems). This implies that additional actions may be necessary if the goal is

to achieve a 90% funding level. One issue that needs to be addressed relates to when a fund is projected to achieve 90% funding level only in later years. How should an actuarial valuation model the plan fund liabilities and costs of the COLA in such a situation? For example, a small deficiency in a fund does not necessarily mean that full funding will not be achieved. It only means full funding will not be achieved by the scheduled amortization date. Consequently, these funds are expected to reach 90% funded status at some future date.

Additionally, the current statutes provide for the full 2.5% COLA to be paid when a fund reaches the 90% funding level (on a market value of assets basis). There is the possibility that a fund may be in the position to satisfy the 90% funding criteria before a higher COLA is paid and be less than 90% funded after paying the higher COLA. This suggests administrative issues that may need to be addressed by the Funds or via law changes.

Finally, we would prefer that all of the actuary reports document the analysis for assuming the COLA assumption being used.

Amortization of Unfunded Actuarial Liability

Earlier, we noted a concern about the funding for Duluth Teachers Retirement Fund Association. However, we note that most of the Funds that we have reviewed share this same issue to a lesser degree. Most of the Funds amortize their unfunded actuarial liability as a level percentage of future payroll. Since future payroll is projected to increase each year, a significant portion of the amortization is pushed back to the later years. In fact, the early years of amortization payments do not even cover the interest on the unfunded actuarial liability. The problem arises when payrolls do not increase as projected. When this happens, the unfunded actuarial liability goes up (not down) since the payments do not cover the interest. A corollary to that problem occurs when using a rolling 25 year amortization such as St. Paul Teachers Retirement Fund. Even if the payroll projection is met, you never cover the interest on the unfunded actuarial liability because you are always in the first year of the amortization.

We have provided the following table in an effort to demonstrate our concern. The question is whether the data is an aberration or a trend for the future. The data in this table was taken from the 2012 actuarial valuation reports.

Geometric Mean Over Select Time Periods

	Payroll Growth Assumption	1-Year	5-Year	10-Year	20-Year
PERA General	3.75%	1.2%	2.9%	3.0%	4.1%
PERA P&F	3.75%	2.4%	4.1%	4.3%	6.2%
MSRS General	3.75%	-3.0%	2.5%	2.1%	2.6%
MSRS State Patrol	3.75%	-1.1%	0.3%	2.4%	3.3%
TRA	3.75%	0.9%	1.9%	3.0%	3.4%
DTRFA	3.50%	-5.3%	-2.1%	-1.1%	0.3%
StPTRFA	4.00%	-0.3%	0.8%	1.7%	3.7%

We note that covered payroll for MSRS General decreased by 3% from fiscal year 2011 to fiscal year 2012. Using fiscal year 2011 as the starting point in the analysis does not produce a geometric mean greater than the payroll growth assumption for any time period other than the 1-year period where the increase was 4%.

Section 2: Standards for Actuarial Work

American Academy of Actuaries Actuarial Standards of Practice

The Actuarial Standards Board of the Academy of Actuaries establishes and improves standards of actuarial practice. These Actuarial Standards of Practice (ASOPs) identify what the actuary should consider, document, and disclose when performing an actuarial assignment. Standards of practice are in place to assure the public that actuaries are professionally accountable. At the same time, the standards provide practicing actuaries with a basis for assuring that their work will conform to appropriate practices. Written standards of practice, coupled with written provisions for disciplining members, show that the profession governs itself and takes an active interest in protecting the public.

There are ASOPs for each area of specialty (Casualty, Health, Life, Pension) and also general standards that apply to all practice areas. The specific pension ASOPs that apply to the actuarial work reviewed by Milliman include:

- ASOP 4: Measuring Pension Obligations
- ASOP 27: Selection of Economic Assumptions for Measuring Pension Obligations
- ASOP 35: Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations
- ASOP 44: Selection and Use of Asset Valuation Methods for Pension Valuations

ASOP 35 governs the selection of demographic and other noneconomic assumptions for measuring pension obligations. A revised edition of this standard was adopted by the Actuarial Standards Board of the American Academy of Actuaries in September 2010. This standard is applicable to Members of the American Academy of Actuaries and is effective for any actuarial valuation with a measurement date on or after June 30, 2011. Consequently, the July 1, 2011 actuarial valuation was the first time the revised ASOP 35 standard applies to Members of the American Academy of Actuaries who prepare work for the Minnesota retirement funds.

In last year's report, we noted that the mortality assumption may need to be revised due to the revision to the ASOP 35 standard. There have been recent experience studies completed and revised actuarial assumptions adopted for all of the funds included in this review. Consequently, we believe the current mortality assumption used for the July 1, 2012 actuarial valuations satisfy the requirements in the revised ASOP 35 standard.

ASOP 44, Selection and Use of Asset Valuation Methods for Pension Valuations, governs the asset valuation method. This ASOP provides that the asset valuation method, which is used to develop the actuarial value of assets, should bear a reasonable relationship to the market value. It further provides that the asset valuation method should be likely to satisfy both of the following:

- Produce values within a reasonable range around market value AND
- Recognize differences from market value in a reasonable amount of time.

In lieu of both of the above, the standard will be met if either of the following requirements is satisfied:

- There is a sufficiently narrow range around the market value OR
- The method recognizes differences from market value in a sufficiently short period.

We believe the methodology in statute meets the requirements of ASOP 44 because it recognizes the difference between market value and actuarial value in a sufficiently short period.

The purpose of an asset valuation method is to reduce volatility in the value of assets that is used in the valuation process thereby creating more stable contribution rates. However, it is important to recognize

the difference between the actuarial and market value of assets and the impact the deferred investment experience will have on future valuations. As required by the LCPR actuarial standards of practice, the valuation reports include the difference between actuarial and market value of assets, and provide the funded ratio and actuarial contribution rate on a market value basis.

ASOP 4 governs the calculation of pension obligations and the communication of those results. In general, the report should contain sufficient information such that:

- It would be properly interpreted and applied by the person to whom the communication is directed, and
- Another actuary in the pension practice could form an opinion about the reasonableness of the conclusion.

Standard of Practice No. 4 also indicates specific requirements for content of actuarial reports including:

- The name of the person or firm retaining the actuary and the purpose of the report,
- An outline of the benefits being valued,
- The effective date of the calculation,
- A summary of the participant data,
- A summary of asset information,
- A description of the actuarial methods and assumptions, and
- A statement of the findings, conclusions or recommendations necessary to satisfy the purpose of the communication.

We believe that all of the reports meet these requirements.

Standards for Actuarial Work (Legislative Commission on Pensions and Retirement)

The Legislative Commission on Pensions and Retirement (LCPR) has adopted standards for actuarial work. The purposes of the standards are:

1. To ensure that sound actuarial procedures are utilized in developing actuarial assumptions, actuarial valuations, and cost estimates for proposed legislation for each retirement plan.
2. To establish sufficient uniformity of actuarial procedures that financial comparability of the retirement plans of the State of Minnesota is maximized.
3. To facilitate the development of sound public policy decision making in the pension area by the Legislature and the Legislative Commission on Pension and Retirement.

These standards are updated periodically, most recently as of August 11, 2010. All actuarial work for retirement plans subject to Minnesota Statutes, Section 356.215 and not subject to Minnesota Statutes, Section 356.216 must be prepared in accordance with the appropriate standards in effect as of the date of the valuation. Specific comments regarding the Commission's Standards are included in our discussion of each Plan.

Section 3: Duluth Teachers Retirement Fund Association

Audit Conclusion

The Duluth Teachers Retirement Fund Association (DTRFA) is made up of one fund. The fund covers the public school teachers employed by Duluth public schools (except charter school teachers).

In general, the fund experienced a decrease in the accrued liability funded ratio and an increase in the contribution rate deficiency. When comparing the market value of assets to the actuarial value of assets, there are still asset losses remaining to be recognized. As these asset losses are recognized, the contribution rate deficiency is expected to increase. In addition, the DTRFA is a mature fund with about 40% of its membership in pay status representing almost 70% of the Actuarial Accrued Liability.

The following assumption changes were reflected in the July 1, 2012 actuarial valuation of the Fund:

- The interest rate was changed from 8.5% to 8.0% for the period July 1, 2012 through June 30, 2017, and 8.50% thereafter. This change was the result of the 2012 Omnibus Retirement Bill.
- The payroll growth assumption was reduced from 4.5% to 3.5%. This change was the result of the 2012 Omnibus Retirement Bill.
- The salary scale, mortality, turnover, and retirement assumptions were updated based on an experience study.

Following Minnesota Statute 356.215 Subdivision 11, the statutory amortization date was extended from June 30, 2035 to June 30, 2039 due to the increase in the accrued liability from the changes in actuarial assumptions.

For the July 1, 2012 Actuarial Valuation of the DTRFA, Milliman prepared a replication audit. Detailed information regarding the replication audit is provided in a separate report dated January 24, 2013; however, there is one finding from our review that warrants the LCPR's attention. Overall, we are satisfied that the July 1, 2012 actuarial valuation results for the Fund as prepared by the Fund actuary present a fair and reasonable representation of the present value of future benefits. We note some differences in the actuarial liabilities and contribution requirements for the Fund due to a different application of the Entry Age Normal Cost Method (see discussion below). In addition, we have also provided some general comments regarding the result of the audit in this report.

We note there appears to be a difference in the application of the entry age normal actuarial cost method between the Milliman results and the results prepared by the fund actuary. The Milliman results employ a method which bases the normal cost rate on the benefits to be earned by current members based on each member's benefit structure. In determining the normal cost rate, we assumed the current plan design has been in effect since date of hire. This approach will result in a normal cost rate that is level over a member's career. Subject to changes in the demographic composition of the active member group, the normal cost rate for the fund as a whole will decrease over time under the current benefit structure as new members with lower benefits replace current members with higher benefits.

We believe the fund actuary's results are based on the normal cost rate using the same benefit structure for new hires on all current members. Under this application of the entry age normal actuarial cost method, the part of the current members' future accruals that will no longer be funded via normal cost rate are essentially capitalized as the actuarial accrued liability and therefore funded via amortization of the unfunded actuarial accrued liability. This approach will result in a normal cost rate that is level over time, subject to changes in the demographic composition of the active member group.

In practice, we have seen both applications of the entry age normal actuarial cost method used for governmental employer pension plans. However, there is a concern about consistency between the results produced by different Fund Actuaries. Based on the prior replication valuations we have prepared,

we believe that all of the other Fund Actuaries use the method we have employed. It is also questionable whether this method satisfies the requirements of Section III of the Standards For Actuarial Work as updated by the Legislative Commission on August 11, 2010.

As required by Minnesota Statutes, the Unfunded Actuarial Accrued Liability (UAAL) is amortized as a level percent of payroll from the valuation date to the statutory amortization date to determine the Actuarial Required Contribution Rate. Currently, the actuary applies an assumed payroll growth assumption of 3.50% as set in statute to determine the amortization rate to pay off the UAAL. A review of the data set forth in Section 4, Exhibit III of the fund actuary's report provides a clear downward trend in payroll from June 30, 2008 to June 30, 2011 with a slight increase in the June 30, 2012 fiscal year. Looking further back, the annual payroll growth from June 30, 1992 through June 30, 2012 is slightly over 0.3%. The implication of future payroll lower than what was projected by the actuarial assumptions is that the calculated amortization payment is not sufficient to pay off the Unfunded Actuarial Accrued Liability by the statutory amortization date. For example, the fund actuary's report calls for a supplemental contribution amortization of \$7.8 million; whereas, interest alone on the unfunded liability is over \$9.5 million. For a growing payroll situation, this lower contribution is offset by higher contributions in the future. However, if payroll is not growing, the lower contributions are not offset and the deficit grows instead of shrinks. Given the mature state of this Fund, we believe this assumption should be addressed with consideration given to a level dollar amortization method.

There is an inherent upward bias in the calculation of the Actuarial Required Contribution rate due to the combined impact of the fund actuary's application of the Entry Age normal actuarial cost method and the amortization of the Unfunded Actuarial Accrued Liability as a level percentage of payroll for this fund. Under Minnesota Statutes, the Actuarial Contribution rate is not required to be contributed to the Fund. Instead, this measure is compared to the Statutorily Required Contributions to assess the adequacy of the current contributions. Using Milliman's replication results, the table below illustrates the differences in the calculation of the Contribution Sufficiency/Deficiency measure in dollar terms:

Duluth Teachers' Retirement Fund Association
Illustrative Contribution Sufficiency/(Deficiency) Measure Using Milliman Results

(dollars in thousands)

Entry Age Normal Method	Newly Hired Member's Benefit Structure	Each Member's Benefit Structure	Each Member's Benefit Structure
Amortization Method	Level Percent of Payroll	Level Percent of Payroll	Level Dollar
1. Statutory Contributions	\$7,348	\$7,348	\$7,348
2. Required Contributions			
a. Normal Cost	3,591	3,844	3,844
b. Amortization of the Unfunded Actuarial Accrued Liability	7,652	7,607	10,034
c. Expense	<u>587</u>	<u>587</u>	<u>587</u>
d. Total [2.a. + 2.b. + 2.c.]	11,830	12,038	14,465
Sufficiency/(Deficiency) [1.- 2.d.]	\$(4,482)	\$(4,690)	\$(7,117)

CommentsMembership Data

We received the original data file prepared by the Fund and supplied to the actuary. We found that the data elements were being used in a consistent manner by the fund actuary. We also noted that the number of records and other summary values listed in the report were reasonable. Based upon this, we believe the data used by the actuary to prepare the actuarial valuation is appropriate and reasonably accurate.

Actuarial Value of Assets

We have reviewed the application of the asset smoothing method. It is the method defined in statute and we believe that this method has been applied correctly.

Actuarial Valuation

In addition to preparing our own valuation results, we reviewed 12 sample life calculations (6 active, 4 in-pay, 2 deferred vested). We reviewed calculated values by decrement and matched the values provided by the actuary to within a reasonable degree of tolerance in the sample lives.

Funding Method

Except as noted above, we believe that the actuary has correctly applied all other aspects of the Entry Age Normal funding method as provided in the statutes. This has been verified in our replication valuation. In addition, the total required contribution follows the methodology provided in Minnesota Statutes 356.215.

Actuarial Assumptions

We have reviewed the actuarial assumptions as summarized in the actuarial valuation. We have confirmed in our replication valuation that the fund actuary has applied these assumptions as summarized in the report, and we have also confirmed the appropriate use of assumptions required by Chapter 356.215, except as noted below.

We note there appears to be a substantial difference between the fund actuary's results and our results for active Member benefits for deferred retirement and refund of contributions. This apparent difference is due to the approaches used in the valuation system when an active Member is assumed to leave the System by withdrawal. In the actuarial assumptions, Members who withdraw from the System after becoming eligible for a deferred benefit are assumed to take the larger of their return of contributions, or their deferred annuity benefit. In the fund actuary's results, the benefits are included in the deferred retirement component if the member is projected to be vested at the time of withdrawal. Otherwise, the benefits are included in the refund of contributions component. In the Milliman results, the deferred retirement component includes the value of annuity benefits for vested Members who withdraw from the System. The refund of contributions component includes both the refund of contributions for members who are not vested at the date of assumed withdrawal plus the value of the return of contributions for Members who are assumed to elect a refund of contributions in lieu of future annuity benefits. Because the fund actuary's present value of future benefits for the withdrawal decrement (sum of deferred retirement component plus refund of contributions component) is within 3.6% of the Milliman results and the total amount of this category is relatively low compared to the total plan, we believe this difference is not material to the overall valuation.

We further note there is a substantial difference between the Fund Actuary's results and our results for terminated members. For deferred retirements with future augmentation, we believe this difference is due to

different application of the actuarial standards for terminations that are expected following the member's vesting date. According to the actuarial standards, the proper technique is to assume that the member selects the benefit with the greater value. Thus, for each year after the member's vesting date, the actuarial present value of Projected Benefits is based on the larger of the member's contributions accumulated with interest or the present value of the member's vested deferred benefit (augmented, if appropriate). In our valuation, we determine the greater value as of the former member's assumed retirement date, and then discounting the greater value from the member's assumed retirement date to the valuation date. In the Fund Actuary's valuation, it is our understanding that the greater value is determined by comparing the present value of the deferred benefit as of the valuation date to the member's contributions accumulated with interest at the valuation date. Because the interest on accumulated contributions is 4% and the interest discount factor is 8% for the first 5 years and 8.5% thereafter, the Fund Actuary's method produces a higher present value.

As part of legislation enacted in 2010, the annual Cost of Living Adjustment (COLA) applied to the pensions of retired Members was changed to 0.0% if the Accrued Liability Funded Ratio is less than 80%. However, if the Fund achieves at least 80%, but less than 90% funded ratio on the actuarial value of assets to actuarial liability, the COLA will increase to 1.0%. The valuation by the Fund Actuary assumes that the lower 0.0% COLA will remain in place for all years. As stated in the Fund Actuary's report, this assumption is based on the projections that indicate a steadily declining funding level in the future given the current statutory contribution schedule. We believe this assumption is reasonable.

In addition, the actuarial assumptions description regarding the treatment of unknown data is somewhat vague. We recommend a more detailed description of this assumption.

Plan Provisions

We have reviewed the sample life calculations for compliance with Chapter 354A of the Minnesota statutes. We believe that these calculations reasonably reflect the benefits provided under the statute. In addition, the Actuarial Valuation Report contains a summary of the plan provisions. We believe this summary reasonably reflects the benefits provided under the statute.

Actuarial Report

The information provided in the Actuarial Valuation Report appears to meet all of the requirements of the Standards for Actuarial Work established by the State of Minnesota Legislative Commission on Pensions and Retirement with one exception. The Actuarial Standards require the disclosure of certain funding measurements based upon the market value of assets.

There are some other items worthy of note with respect to the report. First, we are pleased that the report contains a ten year projection of cash flows. Second, the report does not separately provide costs related to expected refunds by active members who terminate employment. Third, we believe it would be a good enhancement to the report if the assumptions section reflected the date of the last experience analysis on which the assumptions are based (although we note that the body of the report does discuss this information).

Section 4: Minnesota Public Employees Retirement Association

Audit Conclusion

The Minnesota Public Employees Retirement Association (PERA) is made up of four funds. The funds cover the general membership (General), police and fire members (P&F), local correctional members (Correctional), and the Minneapolis Employees' Retirement Fund (MERF Division of PERA), reflecting the distinct benefit provisions and contribution rate requirements of each group.

For the July 1, 2012 Actuarial Valuations of the PERA Funds, Milliman prepared a sample life audit of the General Fund, the Police and Fire Fund, and the MERF Division of PERA. Commentary and results on the sample life audits are provided below.

The following assumption changes were reflected in the July 1, 2012 actuarial valuation of the Fund:

- The interest rate was changed from 8.5% to 8.0% for the period July 1, 2012 through June 30, 2017, and 8.50% thereafter. This change was the result of the 2012 Omnibus Retirement Bill.
- The salary scale assumption for PERA General was updated, and other actuarial assumptions for PERA Local Correctional were updated based on an experience study.

In general, PERA General showed modest declines in all of the funded ratios and in the contribution rate sufficiency/deficiency measure as reported by the Fund Actuary. PERA P&F showed a larger decline than PERA General. The primary reasons for decline in the contribution rate sufficiency/deficiency measure are the recognition of deferred investment losses in the actuarial value of assets and the change in assumed investment return.

As of July 1, 2012, the unrecognized portion of the asset losses from the 2009 and 2012 fiscal years are approximately equal to the asset gains from the 2010 and 2011 fiscal years. Consequently, the actuarial value of assets is approximately equal to the market value of assets at July 1, 2012.

General

The General Fund now has a modest contribution rate deficiency. Absent favorable actuarial experience, the funded status of the plan is expected to decline slightly in the short term and then improve. However, upon reaching 90%, the 2.5% COLA will become an issue since a funding deficiency is likely to result.

Police & Fire

There is a 7.94% of pay deficiency using the actuarial value of assets. This is a significant deficiency in the contribution rates. Without increases in the contribution rate or favorable actuarial experience, the plan's funded status is expected to deteriorate. We also note the addition of four new consolidation funds merged into the Police & Fire Fund.

MERF Division of PERA

Both the funded ratios and contribution rate sufficiency/deficiency measure decreased slightly for the MERF Division of PERA. This decrease is primarily due to investment losses from the prior fiscal year and the change in assumed investment return. As of July 1, 2012, the Accrued Liability Funded Ratio is 69.10%. When this ratio reaches 80%, the MERF Division will be merged with the PERA General Fund. Upon the merger, the remaining liability will be amortized as a level dollar amount through June 30, 2031. The payment will be based on the assumptions of the PERA General Fund.

Local Correctional

The PERA Correctional fund was not part of our review; however, we note the following information from the Fund Actuary's report: Based on the actuarial value of assets, the Plan is 89% funded and the statutory contribution exceeds the required contribution by 0.13%. In the prior year, the funded percentage exceeded

90%. According to the Fund Actuary, 2.5% COLA was applied in the 2012 Actuarial Valuation. However, the Fund Actuary has recommended a review of this situation prior to the 2013 Actuarial Valuation. We agree with this recommendation in order to identify a rational and consistent method to value the COLA and avoid changing from year to year.

Unless otherwise noted, the following comments apply to all three funds included in the sample life audits.

Comments

Membership Data

We received the original data file prepared by the Fund and supplied to the actuary. We found that the data elements were being used in a consistent manner by the Fund Actuary. We also noted that the number of records and other summary values listed in the report were within a reasonable tolerance to our own totals. Based upon this, we believe the data used by the actuary to prepare the actuarial valuation is appropriate and reasonably accurate.

Actuarial Value of Assets

We have reviewed the application of the asset smoothing method for PERA General and P&F. It is the method defined in statute and we believe that this method has been applied correctly. It is relevant to note that the calculated actuarial value of assets is now approximately equal to the reported market value of assets for both funds. Because the ratio of the actuarial value of assets to the market value of assets is approximately 100.5% for both funds, there are not significant differences on funding measures when comparing actuarial value of assets to market value of assets. For the MERF Division of PERA, the Market Value of Assets is used. It is the method defined in Statute.

Actuarial Valuation

We reviewed 36 sample life calculations (13 active, 16 in-pay and 7 deferred vested). We reviewed calculated values by decrement and matched the values provided by the actuary to within a reasonable degree of tolerance. Based upon this limited review, we believe the actuarial calculations summarized in the actuary's report are reasonably accurate.

Funding Method

We believe that the actuary has correctly applied the Entry Age Normal funding method as provided in the statutes. This has been verified on a limited basis by the sample life calculations reviewed in the Actuarial Valuation section. In addition, the total required contribution follows the methodology provided in Minnesota Statutes 356.215. In applying the Funding Method, it is our understanding that the Fund Administrator asserts the exception related to amortization dates in Minnesota Statutes 356.215 Subdivision 11 provided to the PERA General Fund also applies to the MERF Division of PERA. In addition, the Fund Actuary asserts that no change in amortization date would have occurred if the exception were not applied.

Actuarial Assumptions

We have reviewed the actuarial assumptions as summarized in the actuarial valuation. We have confirmed that the sample life calculations from the Actuarial Valuation section have applied these assumptions as summarized in the report. We have also confirmed the appropriate use of assumptions required by Chapter 356.215. All other assumptions were selected by the Fund and the actuary.

The valuation results were prepared using investment return assumptions as required by the 2012 Omnibus Retirement Bill and new salary scale assumption for PERA General.

In general, we believe that the assumptions employed by the Fund Actuary for the MERF Division of PERA are reasonable and consistent with statutes and the Standards for Actuarial Work with one possible exception. The retirement rate assumption for this fund is that 100% of active members retire at age 61. The valuation results prepared by the Fund Actuary are consistent with the assumptions approved by the LCPR. We note Section II.D(4) of the Standards for Actuarial Work states:

"Members Remaining Active Beyond the Age at Which the Retirement Rate becomes 100% - Each remaining active member must be assumed to retire one year following the valuation date unless a different timing assumption is approved by the Commission. Remaining active members must be included in the valuation for all purposes."

Because the assumptions were approved by the LCPR, we concluded that the valuation results were consistent with the Standards for Actuarial Work.

Because the Fund is closed and there is a relatively small number of active members who are close to retirement age, there is not a significant impact on the valuation results.

Plan Provisions

We have reviewed the sample life calculations for compliance with Chapter 353 of the Minnesota statutes. We believe that these calculations reasonably reflect the benefits provided under the statute. In addition, the Actuarial Valuation Report contains a summary of the plan provisions. We believe this summary reasonably reflects the benefits provided under the statute.

Actuarial Report

The information provided in the Actuarial Valuation Report appears to meet the requirements of the Standards for Actuarial Work established by the State of Minnesota Legislative Commission on Pensions and Retirement. The information contained in the report appears to be accurate and provides the information in a logical progression.

In all reports, the fund actuary has stated the assumption that the lower COLA will be used. While we agree with this assumption, it would be useful information if the analysis behind this determination were disclosed in the report.

In all reports, the Fund Actuary has provided the expected impact on the valuation results if the COLA provision reverted back to a 2.5% level upon reaching a 90% funding level. We find this to be useful information in understanding this issue. We agree with the Fund Actuary's assessment that the 2.5% COLA is not expected to apply for PERA General, Police & Fire, and MERF Division of PERA. However, the Local Correctional fund is at 89%. The appropriate application of the COLA will need to be clarified for both future administration and actuarial valuation of the fund.

Section 5: Minnesota State Retirement System

Audit Conclusion

The Minnesota State Retirement System (MSRS) is made up of six funds. The funds cover the state employees (General), state patrol, correctional members (Correctional), judges, and certain grandfathered elected officers and legislators. Each fund reflects the distinct benefit provisions and contribution rate requirements of each group.

For the July 1, 2012 Actuarial Valuations of the MSRS Funds, Milliman prepared Sample Life Audits of the General and State Patrol funds. Commentary and results on the sample life audits for these two funds is provided below.

The following assumption changes were reflected in the July 1, 2012 actuarial valuation of the Fund:

- The interest rate was changed from 8.5% to 8.0% for the period July 1, 2012 through June 30, 2017, and 8.50% thereafter. This change was the result of the 2012 Omnibus Retirement Bill.
- The payroll growth assumption was reduced from 4.5% to 3.75% for MSRS State Patrol. This change was the result of the 2012 Omnibus Retirement Bill.
- The salary scale, mortality, turnover, disability, retirement, form of payment, age of spouse and percentage married assumptions for MSRS State Patrol were updated based on an experience study.
- The salary scale for MSRS General was updated based on an experience study.

In general, the two funds that we reviewed showed declines in the Accrued Liability funded ratios and an increase in the contribution rate deficiency as reported by the Fund Actuary. The primary reasons for the increase in the contribution rate deficiency measure are the recognition of deferred investment losses in the actuarial value of assets and the change in assumed investment return.

As of July 1, 2012, the unrecognized portion of the asset losses from the 2009 and 2012 fiscal years are approximately equal to the asset gains from the 2010 and 2011 fiscal years. Consequently, the actuarial value of assets is approximately equal to the market value of assets at July 1, 2012.

While we did not review the MSRS Correctional Fund or the MSRS Judges Fund, we have provided some additional commentary based upon the Fund Actuary's report.

Additional discussion of the four on-going funds follows:

General

A modest contribution rate deficiency remains. This measure is likely to decline for the next year as asset losses are recognized and because statutory contributions are less than actuarially required. Without increases in the contribution rate or favorable actuarial experience, the plan's funded status is expected to deteriorate.

Correctional

The contribution rate deficiency has improved slightly. The primary reason is the recognition of assumption changes. The percent of pay deficiency is 4.58% using the actuarial value of assets. This is a significant deficiency in the contribution rates. Without increases in the contribution rate or favorable actuarial experience, the plan's funded status is expected to deteriorate.

State Patrol

The funded status is expected to decline over the next four years, absent favorable experience. The statutory contribution rate remained at 31.00%. We note that the normal cost rate plus expenses is 21.87%. Most of the contributions are needed to cover the ongoing cost of benefits in the current year (normal cost plus expenses). The excess of the statutory contributions over the normal cost rate plus expenses is not sufficient to amortize the unfunded accrued liability. Therefore, the unfunded actuarial accrued liability will be expected to increase. Absent higher contribution rates or significant actuarial gains the funded status of the Plan is expected to decline from its current status.

Judges

The Judges plan has a statutory contribution rate that is almost 10 percentage points higher than the normal cost rate. However, its funded status is very weak (51% on an actuarial value basis) so the UAAL contribution is higher than the normal cost rate. Because the Fund has a contribution deficiency of more than 13% of pay, the funded status is expected to decrease.

Unless otherwise noted, the following comments apply to both the General and State Patrol funds.

Comments**Membership Data**

We received the original data file prepared by the Fund and supplied to the actuary. Generally, we found that the data elements were being used in a consistent manner by the Fund Actuary. There are some instances when the Fund Actuary has made assumptions about missing data. We also noted that the number of records and other summary values listed in the report were within a reasonable tolerance to our own totals. Based upon this, we believe the data used by the actuary to prepare the actuarial valuation is appropriate and reasonably accurate.

Actuarial Value of Assets

We have reviewed the application of the asset smoothing method. It is the method defined in statute and we believe that this method has been applied correctly. It is relevant to note that the calculated actuarial value of assets now exceeds the reported market value of assets for both funds. Because the ratio of the actuarial value of assets to the market value of assets is approximately 101% for both funds, there are not significant differences on funding measures when comparing actuarial value of assets to market value of assets.

Actuarial Valuation

We reviewed 23 sample life calculations (10 active, 8 in-pay and 5 deferred vested). We reviewed calculated values by decrement and matched the values provided by the actuary to within a reasonable degree of tolerance. Based upon this limited review, we believe the actuarial calculations summarized in the actuary's report are reasonably accurate.

Funding Method

We believe that the actuary has correctly applied the Entry Age Normal funding method as provided in the statutes. This has been verified on a limited basis by the sample life calculations reviewed in the Actuarial Valuation section. In addition, the total required contribution follows the methodology provided in Minnesota Statutes 356.215 with the exception for the General Fund. We note there is no indication in the Fund Actuary's report that the amortization date extension analysis required under Minnesota Statutes 356.215 Subdivision 11 has been performed. The Fund Actuary has commented that the analysis was performed and

resulted in an unchanged amortization date.

Actuarial Assumptions

We have reviewed the actuarial assumptions as summarized in the actuarial valuation. We have confirmed that the sample life calculations from the Actuarial Valuation section have applied these assumptions as summarized in the report. We have also confirmed the appropriate use of assumptions required by Chapter 356.215. All other assumptions were selected by the Fund and the actuary.

The valuation results were prepared using investment return and payroll growth assumptions as required by the 2012 Omnibus Retirement Bill and new actuarial assumptions based on an experience study.

We note that the Fund Actuary has assumed that former Members with deferred vested benefits will elect a single life annuity. Our valuation assumes that percentages of these Members will elect optional forms the same as for regular retirements. We believe that either assumption is reasonable; however, our preference is to use the "blended" assumption.

Plan Provisions

We have reviewed the sample life calculations for compliance with Chapter 352 of the Minnesota statutes. We believe that these calculations reasonably reflect the benefits provided under the statute. In addition, the Actuarial Valuation Report contains a summary of the plan provisions. We believe this summary reasonably reflects the benefits provided under the statute.

Actuarial Report

The information provided in the Actuarial Valuation Report appears to meet the requirements of the Standards for Actuarial Work established by the State of Minnesota Legislative Commission on Pensions and Retirement. The information contained in the report appears to be accurate and provides the information in a logical progression.

In all reports, the Fund Actuary has provided the expected impact on the valuation results if the COLA provision reverted back to a 2.5% level upon reaching a 90% funding level. We find this to be useful information in understanding this issue. We agree with the Fund Actuary's assessment that the 2.5% COLA is not expected to apply.

Section 6: St. Paul Teachers Retirement Fund Association

Audit Conclusion

The St. Paul Teachers Retirement Fund Association (StPTRFA) is made up of one fund. The fund covers the public school teachers employed by St. Paul public schools (except charter school teachers).

In general, the fund showed a decrease in the accrued liability funded ratio and projected benefit funded ratio, as well as an increase in the contribution rate deficiency. As noted below, the Fund Actuary has included the scheduled contribution rate increases of 1% phased in over the next two years in the projected benefit funded ratio. While including these known contribution rate increases seems logical, this methodology has not been consistently applied in this manner by the other Funds. More consistency between the funds concerning this measure would be desirable.

As noted in the Fund Actuary's report, the official valuation results were prepared according to the assumptions approved by the LCPR. The Fund Actuary's report further points out that these official results do not include the full set of recommended assumptions from the Fund Actuary's experience study. In the Appendix to the Fund Actuary's report, alternative results are presented using different actuarial assumptions. To be consistent with the change in the payroll growth assumption, we believe it makes sense to also use the revised salary scale assumption as recommended by the Fund Actuary. Using the alternative results presented in the Appendix to the Fund Actuary's report, the recommended salary scale assumption would produce a contribution rate deficiency measure of 5.05% compared to the 6.40% deficiency reported in the official results. In addition to this adjustment, the reader should note that there are scheduled increases to the statutory contribution rate for both members and employers that in total will further reduce the contribution rate deficiency measure by 1.00% of payroll over the next two years.

The following assumption changes were reflected in the official July 1, 2012 actuarial valuation of the Fund:

- The interest rate was changed from 8.5% to 8.0% for the period July 1, 2012 through June 30, 2017, and 8.50% thereafter. This change was the result of the 2012 Omnibus Retirement Bill.
- The payroll growth assumption was reduced from 5% to 4%. This change was the result of the 2012 Omnibus Retirement Bill.
- The salary scale, mortality, turnover, disability, and retirement assumptions were updated based on an experience study.

The Fund actuary determined the Supplemental Contribution Amortization of the Unfunded Actuarial Accrued Liability using a 25-year rolling amortization period as described in Minnesota Statutes Section 356.215 Subd. 11(j). We question whether 356.215 Subd. 11(c) should be applied due to the change in assumptions.

For the July 1, 2012 Actuarial Valuation of the StPTRFA, Milliman prepared a replication audit. Detailed information regarding the replication audit is provided in a separate report dated January 7, 2013; however, we have provided some general comments regarding the result of the audit in this report.

Comments

Membership Data

We received the original data file prepared by the Fund and supplied to the actuary. We found that most of the data elements were being used in a consistent manner by the Fund Actuary. We also noted that the number of records and other summary values listed in the report were reasonable.

We note that there appears to be a difference in the processing of valuation payroll for active members with less than 1 year of service. Our processing of valuation payroll is to use an annualized payroll amount of \$31,550 for such members. It is our understanding that the Fund Actuary uses the reported payroll for active members with less than 1 year of service. We believe that this difference in data processing is also the source for the difference in projected payroll that is discussed further in our replication valuation report in the section on actuarial assumptions.

For terminated members, it is our understanding that the Fund Actuary supplements the data reported by the fund with salary history information that the Fund Actuary maintains. The Fund Actuary shared this information for deferred retirements with future augmentation with us. When we used this supplemental information, our aggregate valuation results are more than 5% different from the Fund Actuary's results. Our valuation systems appear to produce similar difference for the sample life we reviewed.

Our conclusion is that the Fund Actuary is reasonably reflecting the data received from SPTRFA to within a reasonable degree of tolerance with our own determinations.

Actuarial Value of Assets

We have reviewed the application of the asset smoothing method. It is the method defined in statute, and we believe that this method has been applied correctly.

Actuarial Valuation

In addition to preparing our own valuation results, we reviewed 12 sample life calculations (6 active, 4 in-pay, 2 deferred vested). We reviewed calculated values by decrement and matched the values provided by the actuary to within a reasonable degree of tolerance.

Based upon our review, we believe the actuarial calculations summarized in the actuary's report are reasonably accurate.

Funding Method

We believe that the actuary has correctly applied the Entry Age Normal funding method as provided in the statutes. This has been verified in our replication valuation. In addition, the total required contribution follows the methodology provided in Minnesota Statutes 356.215.

Actuarial Assumptions

We have reviewed the actuarial assumptions as summarized in the actuarial valuation. We have confirmed in our replication valuation that the Fund Actuary has applied these assumptions as summarized in the report, except as noted below. We have also confirmed the appropriate use of assumptions required by Chapter 356.215. All other assumptions were selected by the Fund and the actuary and appear to be reasonable at this time.

It is worth noting that differences in the system application of assumptions can be different. For example, we note there appears to be a substantial difference between the Fund Actuary's results and our results for active Member benefits for deferred retirement and refund of contributions. This apparent difference is due to the approaches used in the valuation system when an active Member is assumed to leave the System by withdrawal. In the actuarial assumptions, Members who withdraw from the System after becoming eligible for a deferred benefit are assumed to take the larger of their return of contributions, or their deferred annuity benefit. In the Fund

Actuary's results, the benefits are included in the deferred retirement component if the member is projected to be vested at the time of withdrawal. Otherwise, the benefits are included in the refund of contributions component. In the Milliman results, the deferred retirement component includes the value of annuity benefits for vested Members who withdraw from the System. The refund of contributions component includes both the refund of contributions for members who are not vested at the date of assumed withdrawal plus the value of the return of contributions for Members who are assumed to elect a refund of contributions in lieu of future annuity benefits. Because the Fund Actuary's present value of future benefits for the withdrawal decrement (sum of deferred retirement component plus refund of contributions component) is within 5.2% of the Milliman results, we believe the Fund Actuary is reasonably reflecting the withdrawal decrement.

We further note there is a substantial difference between the Fund Actuary's results and our results for terminated members. For deferred retirements with future augmentation, we believe this difference is due to different application of the actuarial standards for terminations that are expected following the member's vesting date. According to the actuarial standards, the proper technique is to assume that the member selects the benefit with the greater value. Thus, for each year after the member's vesting date, the actuarial present value of Projected Benefits is based on the larger of the member's contributions accumulated with interest or the present value of the member's vested deferred benefit (augmented, if appropriate). In our valuation, we determine the greater value as of the former member's assumed retirement date, and then discounting the greater value from the member's assumed retirement date to the valuation date. In the Fund Actuary's valuation, it is our understanding that the greater value is determined by comparing the present value of the deferred benefit as of the valuation date to the member's contributions accumulated with interest at the valuation date. Because the interest on accumulated contributions is 4% and the interest discount factor is 8% for the first 5 years and 8.5% thereafter, the Fund Actuary's method produces a higher present value.

For former members without vested rights, we believe the difference between the Fund Actuary's results and our results are primarily due to the differences in data processing discussed above. In both our and the Fund Actuary's valuation for these members, the present value is determined as the return of employee contributions with interest as of the valuation date. Because we match exactly on the headcounts for these members, we would produce exactly the same results as the Fund Actuary if we were using the same data.

As part of legislation enacted in 2011, the annual Cost of Living Adjustment (COLA) applied to the pensions of retired Members was changed to 1.0% if the Accrued Liability Funded Ratio is less than 80%. However, if the Fund achieves at least 80%, but less than 90% funded ratio on the actuarial value of assets to actuarial liability, the COLA will increase to 2.0%. The valuation by the Fund Actuary assumes that the lower 1.0% COLA will remain in place for all years. As stated in the Fund Actuary's report, this assumption is based on the current market value

funded ratio of 60% and projections that indicate a steadily declining funding level in the future given the current statutory contribution schedule. We believe this assumption is reasonable.

Plan Provisions

We have reviewed the sample life calculations for compliance with Chapter 354A of the Minnesota statutes. We believe that these calculations reasonably reflect the benefits provided under the statute. In addition, the Actuarial Valuation Report contains a summary of the plan provisions. We believe this summary reasonably reflects the benefits provided under the statute.

Actuarial Report

The information provided in the Actuarial Valuation Report appears to meet most of the requirements of the Standards for Actuarial Work established by the State of Minnesota Legislative Commission on Pensions and Retirement.

We would also like to commend the Fund Actuary for the very detailed construction of the gain/loss exhibit which exceeded the requirements of the Actuarial Standards.

The projected benefit funded ratio reported by the Fund Actuary includes the scheduled contribution rate increases of 1% phased in over the next two years in this measure.

We also note the Fund Actuary uses end of year decrement timing for withdrawals and retirements. This timing is permitted by the Standards of Actuarial Work and appears to be applied correctly.

The information contained in the report appears to be accurate and provides the information in a logical progression.

Section 7: Teachers Retirement Association

Audit Conclusion

The Minnesota Teachers Retirement Association (TRA) is made up of one fund. The fund covers the state public school teachers except for those teachers employed by St. Paul or Duluth public schools (except charter school teachers) or the University of Minnesota. Effective July 1, 2006, the Minneapolis Teachers Retirement Fund was merged into this fund.

The fund experienced a decrease in the accrued liability funding ratio and an increase in the contribution rate deficiency. The increase in the contribution rate deficiency measure is mainly due to the change in the interest rate assumption and to the recognition of previously deferred asset losses. We note the contribution rate increases scheduled to be phased in by July 1, 2014 are expected to continue to improve the deficiency measure in this fund.

The following assumption change was reflected in the July 1, 2012 actuarial valuation of the Fund:

- The interest rate was changed from 8.5% to 8.0% for the period July 1, 2012 through June 30, 2017, and 8.50% thereafter. This change was the result of the 2012 Omnibus Retirement Bill.

For the July 1, 2012 Actuarial Valuation, we have prepared a limited scope sample life review of the Fund Actuary's results as provided in our contract. A full replication review was last prepared for the July 1, 2011 Actuarial Valuation. Our comments below reflect the results of our sample life review.

Comments

Membership Data

We received the original data file prepared by the Fund and supplied to the actuary. We found that the data elements were being used in a consistent manner by the Fund Actuary. We also noted that the number of records and other summary values listed in the report were within a reasonable tolerance to our own totals. Based upon this, we believe the data used by the actuary to prepare the actuarial valuation is appropriate and reasonably accurate.

Actuarial Value of Assets

We have reviewed the application of the asset smoothing method. It is the method defined in statute and we believe that this method has been applied correctly. It is relevant to note that the calculated actuarial value of assets now exceeds the reported market value of assets. Because the ratio of the actuarial value of assets to the market value of assets is approximately 101%, there are not significant differences on funding measures when comparing actuarial value of assets to market value of assets.

Actuarial Valuation

We reviewed 14 sample life calculations (8 active, 4 in-pay and 2 deferred vested). We reviewed calculated values by decrement and matched the values provided by the actuary to within a reasonable degree of tolerance. Based upon this review, we believe the actuarial calculations summarized in the actuary's report are reasonably accurate with one item noted below.

For one sample life for a disabled in-pay Member. It appears the member was valued as receiving a Joint & 100% Survivor Annuity even though the retiree data file does not contain any spousal information or form of benefit payment information. This approach covers the death benefit payable to a married disabled member. However, this approach implicitly assumes 100% marriage rate for disabled members and ignores the conversion

from disability to regular retirement when the member reaches Normal Retirement Age. We recommend the Fund Actuary review the implications of the conversion from disability to regular retirement at Normal Retirement Age to determine what, if any, modifications to the actuarial assumptions and/or valuation methodology may be appropriate for future valuations. We recognize that the accrued liability for disabled members is less than 0.65% of the total fund accrued liability and this issue is probably less than 10% of the accrued liability for disabled members. Consequently, this issue is not likely to significantly impact the actuarial valuation results.

Funding Method

We believe that the actuary has correctly applied the Entry Age Normal funding method as provided in the statutes. This has been verified on a limited basis by the sample life calculations reviewed in the Actuarial Valuation section. In addition, the total required contribution follows the methodology provided in Minnesota Statutes 356.215. We note there is no indication in the Fund Actuary's report that the amortization date extension analysis required under Minnesota Statutes 356.215 Subdivision 11 has been performed. Subsequent to issuing the report, the Fund Actuary has performed the analysis which resulted in an unchanged amortization date.

Actuarial Assumptions

We have reviewed the actuarial assumptions as summarized in the actuarial valuation. We have confirmed that the sample life calculations from the Actuarial Valuation section have applied these assumptions as summarized in the report. We have also confirmed the appropriate use of assumptions required by Chapter 356.215. All other assumptions were selected by the Fund and the Fund Actuary.

The valuation results were prepared using investment return assumptions as required by the 2012 Omnibus Retirement Bill.

As noted in our July 1, 2011 replication valuation, there appears to be a substantial difference between the Fund Actuary's results and our replication valuation results for active Member benefits for deferred retirement and refund of contributions. This apparent difference is due to the approaches used in the valuation system when an active Member is assumed to leave the System by withdrawal. In the actuarial assumptions, Members who withdraw from the System after becoming eligible for a deferred benefit are assumed to take the larger of their return of contributions, or their deferred annuity benefit. In the Fund Actuary's results, the benefits are included in the deferred retirement component if the member is projected to be vested at the time of withdrawal. Otherwise, the benefits are included in the refund of contributions component. In the Milliman results, the deferred retirement component includes the value of annuity benefits for vested Members who withdraw from the System. The refund of contributions component includes both the refund of contributions for members who are not vested at the date of assumed withdrawal plus the value of the return of contributions for Members who are assumed to elect a refund of contributions in lieu of future annuity benefits. As noted in our July 1, 2011 replication valuation, we believe the Fund Actuary is reasonably reflecting the withdrawal decrement because the Fund Actuary's present value of future benefits for the withdrawal decrement (sum of deferred retirement component plus refund of contributions

component) is within 1.4% of the Milliman results included in our July 1, 2011 replication valuation.

Plan Provisions

We have reviewed the sample life calculations for compliance with Chapter 354 of the Minnesota statutes. We believe that these calculations reasonably reflect the benefits provided under the statute. In addition, the Actuarial Valuation Report contains a summary of the plan provisions. We believe this summary reasonably reflects the benefits provided under the statute.

We note that the Fund Actuary revised the methodology used to determine the status of inactive members who are not currently in-pay. It is our understanding that the Fund Actuary now determines the status by applying the law in effect at termination. As noted in the Fund Actuary's report, this change has decreased the Unfunded Accrued Actuarial Liability by approximately \$54 million.

Actuarial Report

The information provided in the Actuarial Valuation Report appears to meet all of the requirements of the Standards for Actuarial Work established by the State of Minnesota Legislative Commission on Pensions and Retirement with one exception.

In the assumptions section, we note that the assumption for unknown data does not specify an assumed amount of service. However, the July 1, 2009 actuarial valuation specified 7.5 years of service. We believe the Fund Actuary should state this assumption again in the July 1, 2013 actuarial valuation or that actual data is used if there is no assumption.

Nevertheless, the information contained in the report appears to be accurate and provides the information in a logical progression.

With respect to the valuation of the post-retirement COLA, we agree that the lower 2.0% COLA is appropriate for the July 1, 2012 actuarial valuation based upon the 2011-2012 contribution rates. According to the Fund Actuary's report, this assumption is based on projections that indicate the Fund is not expected to reach a 90% funded ratio at any time in the next 40 years.

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