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July 1, 2011 Actuarial Review
of the Retirement Systems under the

Minnesota Legislative Commission on Pensions and Retirement

June 8, 2012

Prepared by:

Milliman, Inc.

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June 8, 2012

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June 8, 2012

Minnesota Legislative Commission
on Pensions and Retirement
State Office Building, Room 55
100 Rev. Dr. Martin Luther King Jr. Blvd.
St. Paul, Minnesota 55155

ATTN: Mr. Lawrence A. Martin, Executive Director

RE: Actuarial Review of the July 1, 2011 Actuarial Valuation Reports

Ladies and Gentlemen:

The enclosed report presents the findings and comments resulting from a review of the July 1, 2011 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 for the other funds.

Actuarial Review of July 1, 2011 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, 2011 Actuarial Valuation has been performed for TRA. Please see the Milliman client report dated June 8, 2012 for the details of the replication valuation of the July 1, 2011 Actuarial Valuation of TRA. For all of the other funds included in the Actuarial Review, a complete replication of the July 1, 2011 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.

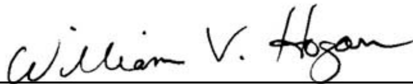
I, William V. Hogan, FSA, am an actuary for Milliman, Inc. I am a member of the American Academy of Actuaries and a Fellow of the Society of Actuaries, and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

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.

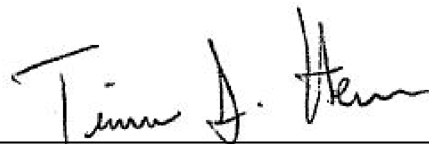
We look forward to making a personal presentation of our findings in briefings to the Minnesota Legislative Commission on Pensions and Retirement and to relevant staff members.

Respectfully submitted,

Milliman, Inc.



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



Timothy J. Herman, FSA, MAAA
Consulting Actuary

WVH/TJH/cw

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July 1, 2011 Actuarial Review
of the Retirement Systems under the

Minnesota Legislative Commission on Pensions and Retirement

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Purpose and Scope of the Actuarial Audit Review

In accordance with Minnesota Statues, 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, 2011 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, 2011 Actuarial Valuation has been performed for TRA. Please see the Milliman client report dated June 8, 2012 for the details of the replication valuation of the July 1, 2011 Actuarial Valuation of TRA. For all of the other funds included in the Actuarial Review, a complete replication of the July 1, 2011 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.

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

1. Due to favorable investment experience for the last two fiscal years, most of the funds using as asset smoothing mechanism now 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. 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.
2. The three statewide general employee funds, PERA Police & Fire, MERF Division of PERA, and StPTRFA have recently completed experience studies and revised assumptions. It is our understanding that experience studies have been authorized for most of the other funds. We expect the experience study to indicate that mortality improvements have occurred since the current

assumptions were adopted. In addition, revised actuarial standards of practice issued by the American Academy of Actuaries in September 2010 call for the actuary to include an assumption as to expected mortality improvement after the measurement date. This will likely result in further deterioration of the funding ratios and contribution requirements for those funds unless the experience studies indicate revisions to other assumptions that would offset the mortality improvement that is expected.

3. 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 2011 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 2011 valuations. However, we believe that there are issues that should be addressed before the July 1, 2012 actuarial valuations. These issues are discussed in greater detail below.

4. Standards for Actuarial Work issued by the LCPR require certain technical assumptions regarding the assumed timing of demographic events such as withdrawing from employment, retiring, etc. Pursuant to these standards, mid-year decrements are preferred and end of the year decrements are an acceptable alternative for 2010 valuations. We note that a number of the valuations are based upon beginning of the year decrements. It is our understanding that the funds that have used this assumption have been using that same assumption in past years. Consequently, the reported amounts are consistent with amounts reported in past years. The LCPR granted an exception to use beginning of the year decrements in the 2011 valuations for these funds. For the MSRS General Fund and the PERA General Fund, we have provided more detail on the differences between the Fund Actuary's values using beginning of the year decrements and our estimated values using mid-year decrements. Our estimated values are based on the replication valuations we performed for these two funds as of July 1, 2010.

5. 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 valuation reports do not contain information in the assumptions section which identifies when the last experience study was prepared for which those assumptions are based upon. We believe adding such information would enhance the value of those reports.

   - We also 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.

   - Finally, 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.

6. 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.

From the 7/1/2009 to the 7/1/2011 actuarial valuations, there have been significant changes to the benefit structure, updates to the actuarial assumptions for five funds, 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 favorable asset returns in excess of the 8.5% actuarial rate of asset return assumption specified by Minnesota statutes for both the fiscal years ending June 30, 2010 and June 30, 2011:

- 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%.

Despite these favorable market value returns, the July 1, 2011 actuarial valuation results indicate investment losses when measured on an actuarial value of assets due to the recognition of asset losses which occurred prior to July 1, 2009.

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.

The work product was prepared solely for the Minnesota Legislative Commission on Pensions and Retirement in their appropriate oversight role to the Minnesota Retirement system. It may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this 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 is 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.

One particular item of which the LCPR should be aware is the change in ASOP 35 in Section 3.5.3 Mortality and Mortality Improvements which states:

The actuary should consider the effect of mortality improvement both prior to and subsequent to the measurement date. With regard to mortality improvement, the actuary should do the following:

> i. adjust mortality rates to reflect mortality improvement prior to the measurement date. For example, if the actuary starts with a published mortality table, the mortality rates may need to be adjusted to reflect mortality improvement from the effective date of the table to the measurement date. Such an adjustment is not necessary if, in the actuary's professional judgment, the published mortality table reflects expected mortality rates as of the measurement date.
>
> ii. include an assumption as to expected mortality improvement after the measurement date. This assumption should be disclosed in accordance with section 4.1.1, even if the actuary concludes that an assumption of zero future improvement is reasonable as described in section 3.1. Note that the existence of uncertainty about the occurrence or magnitude of future mortality improvement does not by itself mean that an assumption of zero future improvement is a reasonable assumption.

We note the prior assumption setting process for the three statewide general employee funds (MSRS General, PERA General, and TRA) was to adjust the mortality assumption based on the results of quadrennial experience analysis with a margin. This process implicitly followed the revised edition of the

standard outlined above. The quadrennial experience study provided the data needed to adjust the mortality tables based on observed mortality improvement to the measurement date and the margins provided for expected mortality improvement after the measurement date and before the next quadrennial experience study was completed.

For the July 1, 2011 actuarial valuations, six funds (MSRS General, PERA General, PERA Police & Fire, PERA MERF, StPTRFA, and TRA) have been prepared using revised actuarial assumptions within the last three years. In our opinion, the mortality assumptions used in the July 1, 2011 actuarial valuations for these funds, with the possible exception of StPTRFA, meet the revised edition of ASOP 35 (we have not reviewed the StPTRFA experience study so we cannot determine if the revised mortality assumption meets the revised edition of this standard.) For the remaining funds, we believe it would be prudent to have an experience study performed.

We expect that such an experience study will likely indicate that mortality improvements have occurred since the current assumptions were adopted. We note that an emerging trend in the actuarial profession is the use of the RP2000 Mortality Table with adjustments for the demographic characteristics of the covered group and Projection Scale AA to reflect mortality improvement both from the base year of the table to the current measurement date and expected mortality improvement after the measurement date. In future sections of this report, we highlight the mortality assumption used in the July 1, 2011 actuarial valuations. If the result of the experience study and assumption setting process is a new set of actuarial assumptions with lower expected future mortality than is currently used in the July 1, 2011 actuarial valuations, the impact of the revised mortality assumption will be to reduce the funded ratios and contribution (deficiency)/sufficiency measure for all affected funds.

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 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.

The work product was prepared solely for the Minnesota Legislative Commission on Pensions and Retirement in their appropriate oversight role to the Minnesota Retirement system. It may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work.

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 decreases in the accrued liability funded ratio, the contribution rate deficiency and projected benefit funded ratio using the actuarial value of assets. As noted below, the Fund Actuary has included the scheduled contribution rate increase of 1% for the next fiscal year in the projected benefit funded ratio measure. While including this known contribution rate increase seems logical, this methodology has not been consistently applied in this manner by the other funds. Also, 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 almost 40% of its membership in pay status representing more than 60% of the Actuarial Accrued Liability.

This fund uses the 1994 Group Annuity Mortality table with some level of setback. As noted by the Fund Actuary, the most recent experience study for the four-year period ending June 30, 2006 indicated the ratio of actual to expected deaths was 113%. The Fund Actuary asserts that this provides a margin for future mortality improvement. We have no reason to disagree with the Fund Actuary's assertion. It is our understanding that an experience study has been authorized for this fund. Any recommended changes in assumptions resulting from this experience study are expected to be used in the July 1, 2012 actuarial valuation of the fund.

Currently, the actuary applies an assumed payroll growth assumption of 4.50% as set in statute. 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. Looking further back, the annual payroll growth from June 30, 1991 through June 30, 2008 is slightly over 1%. We believe this assumption should be addressed with consideration given to a level dollar amortization method. We discuss this issue further down in this section.

In general, we believe that most of the July 1, 2011 actuarial valuation is accurate however there are a few discrepancies that we have identified with respect to a couple of sample lives. We believe the report is complete with a few exceptions as noted below.

Comments

<u>Membership Data</u>: 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.

<u>Actuarial Value of Assets</u>: 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.

<u>Actuarial Valuation</u>: 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. After additional review this year, we confirmed in the applicable sample lives that the issue with Tier I and Tier II benefits described in our July 1, 2010 Actuarial Review has been corrected.

The work product was prepared solely for the Minnesota Legislative Commission on Pensions and Retirement in their appropriate oversight role to the Minnesota Retirement system. It may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work.

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

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 with the possible exception of the salary increase assumption which may be off by one year during the select period. We have also confirmed the appropriate use of assumptions required by Chapter 356.215.

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, while disability rates are provided in the summary of actuarial assumptions, there is no description for the basis of these rates. Also, 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). Finally, the projected benefit funded ratio reported by the Fund Actuary includes the scheduled contribution rate increase of 1% effective for the 2013 fiscal year in this measure. If this contribution rate increase was not included in the calculation, the projected benefit funded ratio would be 90.90% compared to the 92.49% reported in the actuarial valuation.

As mentioned last year, this fund is a significantly mature fund with evidence of a shrinking workforce. The Market Value of Assets exceeds the Actuarial Accrued Liability for annuitants by approximately $5 M. This means that future contributions are required to fund Normal Costs plus administrative expenses plus the Actuarial Accrued Liability of active and inactive members who are not currently in-pay. The ten year cash flow

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projection shows adequate resources to meet benefit payment obligations for the next ten years; however, that projection assumes contributions based upon an increasing payroll as mentioned above. The funding deficiency has increased to -3.74% from -0.69% using an amortization of the unfunded actuarial liability at a 4.5% payroll growth assumption. Using a level dollar amortization of the unfunded actuarial liability, the funding deficiency grows to approximately -8.5%. We believe this may present a more realistic picture of the funded status at this time.

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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, 2011 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.

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 reason for decline in the contribution rate sufficiency/deficiency measure is recognition of deferred investment losses in the actuarial value of assets and the changes in actuarial assumptions.

As of July 1, 2011, the unrecognized portion of the asset losses from the 2008 and 2009 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, 2011.

General

Even with the increase in the contribution rates effective July 1, 2011, the statutory contribution is approximately equal to the required contribution rate. Absent favorable actuarial experience, the funded status of the plan is expected to decline slightly in the short term and then ultimately improve to 100% by the Amortization Date. However, upon reaching 90%, the 2.5% COLA will become effective and a funding deficiency is likely to result.

P&F

There is a 4.78% 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.

MERF Division of PERA

Both the funded ratios and contribution rate sufficiency/deficiency measure improved dramatically for the MERF Division of PERA. This improvement is due to the better than expected asset returns and the addition of the employer supplemental contribution. As of July 1, 2011, the Accrued Liability Funded Ratio is 73.54%. 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.

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 97% funded and the statutory contribution exceeds the required contribution by 1.16%. The statutory contribution rate of 14.58% is only 1.77% higher than the normal cost rate (including expenses). Therefore, the current contribution rate cannot finance an Unfunded Actuarial Accrued Liability of any size. These measures indicate that a future deficiency may be likely as unrecognized asset losses are recognized. This is particularly true if the mortality table requires updating with lower expected mortality rates.

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 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 for PERA General and P&F. It is the method defined in statute and we believe that this method has been applied correctly. 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, 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.

We do note the following items:

- Entry age calculations between the Milliman system and the Fund Actuary system appear to split the termination benefit component a little differently between refund and deferred retirement costs. Overall benefit costs match very closely, and not matching this component exactly is not unusual. However, we intend to pursue the issue further for purposes of the future reviews.
- We do note that the valuation results prepared by the Fund Actuary are based upon beginning of the year decrement timing. While we prefer mid-year decrement timing, we note that the LCPR granted the Fund Actuary an exception from the Standards for Actuarial Work to allow beginning of the year decrement timing for the 2011 actuarial valuations. It is our understanding that prior year results were provided on the basis of beginning of year decrement timing so that there is some consistency between years.
- Based on the results from our 2010 replication valuation for the General Fund, we estimated the 2011 results using midyear decrement timing. The key funding measures prepared by the Fund Actuary and estimated by Milliman midyear decrement timing for the General fund are shown below:

	Actuarial Valuation as of	
	July 1, 2011 (Fund Actuary)	**July 1, 2011 (Milliman Midyear Estimate)**
Contributions (% of Payroll)		
Statutory – Chapter 353	13.50%	13.50%
Required – Chapter 356	13.47%	13.54%
Sufficiency/(Deficiency)	0.03%	(0.04%)

Milliman

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	July 1, 2011 (Fund Actuary)	July 1, 2011 (Milliman Midyear Estimate)
Funding Ratios (dollars in thousands)		
Accrued Liability Funding Ratio		
Current assets	$13,455,753	$13,455,753
Actuarial accrued liability	17,898,849	17,792,211
Funding ratio	75.18%	75.63%

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.

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 for the general fund were prepared using new payroll growth and salary scale actuarial assumptions and new actuarial assumptions for the Police and Fire Fund based on a recent experience study and as approved by the LCPR.

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 two exceptions. We note that the valuation results prepared by the Fund Actuary are based upon beginning of the year decrement timing. While we prefer mid-year decrement timing, we note that the LCPR granted the Fund Actuary an exception from the Standards for Actuarial Work to allow beginning of the year decrement timing for the 2011 actuarial valuations. It is our understanding that prior year results were provided on the basis of beginning of year decrement timing so that there is some consistency between years. 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.

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Because the Fund is closed and the relatively small number of active members who are close to retirement age, there is not a significant impact on the valuation results. Consequently, we have not estimated July 1, 2011 actuarial valuation results to demonstrate the impact of mid-year decrement timing and the assumption that active members aged 61 or older retire one year from the valuation date.

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 most of 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.

One "nit-picky" item relates to the mortality gain/loss for all funds. The reports provide this item for the benefit recipients, which is clearly the major part of this item. While this may satisfy the Actuarial Standards, we believe that future reports could be enhanced by providing the pre-retirement mortality gain/loss in addition to the benefit recipients' mortality gain/loss.

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. Taking this one step further, we agree with the Fund Actuary's assessment that the 2.5% COLA is not expected to apply. However, it is important to note in the case of PERA General that the July 1, 2011 Actuarial Valuation shows a sufficiency of 0.03% (estimated deficiency of 0.04% when measured on a midyear decrement basis).

Under the funding method, this would imply that the General Fund would reach a 90% funding level at some point. However, based upon the information provided in the Fund Actuary's report, we would expect the deficiency to be approximately 3.40% and the funding ratio to drop below 90% when the 2.5% COLA was valued. Consequently, we would agree that the General Fund would never really be expected to meet the 90% funding level, even with the very modest sufficiency that is currently being reported.

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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, 2011 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.

In general, the two funds that we reviewed showed modest declines in the Accrued Liability funded ratios. The General Fund had a very modest increase in the contribution rate deficiency as reported by the Fund Actuary, while the State Patrol Fund showed a decrease in the contribution rate deficiency. The primary reason for the increase in the contribution rate deficiency measure is the recognition of deferred investment losses. We note the 5% contribution rate increase effective July 1, 2011 for the State Patrol fund significantly improved the deficiency measure in this fund. Nevertheless, a significant contribution rate deficiency still exists for both of these funds.

The State Patrol Fund uses the 1983 Group Annuity Mortality with some level of setback. We believe that it is important to note that the funding deficiency for this fund is likely to worsen when the next experience study is performed if an updated mortality table with lower expected mortality rates is required by the experience and revised actuarial standards of practice (which we expect it will be). 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 small contribution rate deficiency remains. This measure is likely to decline over the next two years as asset losses are recognized and because statutory contributions are less than actuarially required.

Correctional

The statutory contribution rate of 20.70% is only 2.64% higher than the normal cost rate and expenses. This situation makes it difficult for the Plan to finance an Unfunded Actuarial Accrued Liability. The evaluation of the long-term health of this fund will be greatly enhanced when a valuation projection is performed. We expect that without contribution increases or significant favorable experience the funded status will steadily decline.

State Patrol

The funded status is expected to decline over the next four years, absent favorable experience. The statutory contribution rate was increased from 26.00% to 31.00%. We note that the normal cost rate plus expenses is 23.05%. While this increase in contributions will help, most of the contributions are still needed to cover the ongoing cost of benefits in the current year (normal cost plus expenses). Therefore, the unfunded actuarial accrued liability will still be expected to increase (albeit not as fast as before). 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 11% more than the normal cost rate. However, its funded status is very weak (59% on an actuarial value basis) so the UAAL contribution is nearly as high as the normal cost rate. Because the Fund has a contribution deficiency of more than 5% 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 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

We reviewed 23 sample life calculations (10 active, 8 in-pay, 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.

We do note the following items:

- We do note that the valuation results prepared by the Fund Actuary are based upon beginning of the year decrement timing. While we prefer mid-year decrement timing, we note that the LCPR granted the Fund Actuary an exception from the Standards for Actuarial Work to allow beginning of the year decrement timing for the 2011 actuarial valuations. It is our understanding that prior year results were provided on the basis of beginning of year decrement timing so that there is some consistency between years.

- Based on the results of our 2010 replication valuation for the General Fund, we estimated the 2011 results using midyear decrement timing. The key funding measures prepared by the Fund Actuary and estimated by Milliman for midyear decrement timing are shown below.

	Actuarial Valuation as of	
	July 1, 2011 (Fund Actuary)	**July 1, 2011 (Milliman Midyear Estimate)**
Contributions (% of Payroll)		
Statutory – Chapter 352	10.00%	10.00%
Required – Chapter 356	11.03%	10.91%
Sufficiency/(Deficiency)	(1.03)%	(0.91)%

	July 1, 2011 (Fund Actuary)	July 1, 2011 (Milliman Midyear Estimate)
Funding Ratios (dollars in thousands)		
Accrued Liability Funding Ratio		
Current assets	$ 9,130,011	$ 9,130,011
Actuarial accrued liability	10,576,481	10,465,329
Funding ratio	86.32%	87.24%

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.

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 for the general fund were prepared using new actuarial assumptions for the payroll growth and salary scale assumptions based on a recent experience study and as required by Minnesota statutes. We note that the base mortality table for General fund is the RP2000 mortality table, and the base mortality table for the State Patrol is the 1983 Group Annuitant Mortality Table. We expect the mortality assumption for the State Patrol may need to be updated when the next experience study is performed.

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 most of 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.

One “nit-picky” item relates to the mortality gain/loss for all funds. The reports provide this item for the benefit recipients, which is clearly the major part of this item. While this may satisfy the Actuarial Standards, we believe that future reports could be enhanced by providing the pre-

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retirement mortality gain/loss in addition to the benefit recipients' mortality gain/loss.

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.

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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 slight improvement in the accrued liability funded ratio and a decrease in the contribution rate deficiency. The projected benefit funded ratio reported by the Fund Actuary showed a modest improvement. As noted below, the Fund Actuary has included the scheduled contribution rate increases of 2% phased in over the next four years in this measure. 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.

This fund uses the 1983 Group Annuity Mortality table with some level of setback. As noted by the Fund Actuary, there is no margin for future mortality improvement. The Fund Actuary recommends the mortality assumption be reviewed in conjunction with an experience study to determine the appropriate margin (if any) to be used in the July 1, 2012 actuarial valuation. It is our understanding that an experience study has been authorized for this fund. We agree with the Fund Actuary's recommendation.

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 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

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.

We note one calculation difference in the valuation for a deferred vested member. For one sample life of a deferred vested coordinated member who is assumed to commence benefits at age 63, the Fund Actuary applied an actuarial reduction from age 65. We believe this member's Normal Retirement Age is age 66. Consequently, we believe the actuarial reduction for the member should be applied from age 66 rather than age 65. However, because this member's employee contribution balance is greater than the present value of the annuity benefit, there is no impact on the present value determined for this member. For deferred vested members where the present value of the annuity benefit is greater than the projected employee contribution account balance, we estimate the present value is overstated approximately 5.6%. Because we have not performed a replication valuation this year, we are not able to estimate the impact on the fund. However, we note a 6% change in the reported accrued liability for deferred vested members is less than 0.40% of the total reported accrued liability for the fund. Consequently, we do not believe that this is a significant issue. We recommend the calculations be updated for future valuations.

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

<u>Funding Method</u>

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.

<u>Actuarial Assumptions</u>

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 and appear to be reasonable at this time.

<u>Plan Provisions</u>

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.

<u>Actuarial Report</u>

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.

One item of note is that the costs related to expected refunds by active members who terminate employment have not been separately reported.

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 2% phased in over the next four year in this measure. If these contribution rate increases were not included in the calculation, the projected benefit funded ratio would be 93.74% compared to the 97.63% reported in the actuarial valuation.

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.

In the summary of benefit provisions for Coordinated Members, the description of the early retirement benefit payable to members hired after July 1, 1989 should be clarified to state that augmentation is from the age at retirement until Normal Retirement Age and that the actuarial reduction is applied for each month the member is under Normal Retirement Age. The current summary describes these adjustments with respect to age 65. For Coordinated Members hired after July 1, 1989, the Normal Retirement Age is either 65 or 66 depending on the member's date of birth.

The information contained in the report appears to be accurate and

provides the information in a logical progression.

The Fund Actuary has applied a 1% COLA on benefits in determining the actuarial present values and contribution requirements. Because the current Actuarial Liability Funded Ratio is less than 80%, this is the correct COLA for the current year. However, the Projected Benefit Funded Ratio reaches just below 100% using the June 30, 2036 amortization date. This measure indicates that a 2% COLA is likely to be in place as the Accrued Liability Funded Ratio will exceed 80% and a 2.5% COLA may apply at some point. It is unclear to us from reviewing the actuarial report what analysis was performed to substantiate the 1% COLA for all years. At a minimum, it would be helpful to better understand what the actuarial values would be if the higher COLA were in place.

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 a decrease in the contribution rate deficiency. The primary reason for the improvement in the contribution rate deficiency measure is the increase in employee and employer contribution rates. 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.

For the July 1, 2011 Actuarial Valuation of the TRA fund, Milliman prepared a replication audit. Detailed information regarding the replication audit is provided in a separate report; 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 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 reported market value of assets now exceeds the calculated actuarial value of assets.

Actuarial Valuation

In addition to preparing our own valuation results, we reviewed 16 sample life calculations (10 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 0.75% of the total fund accrued liability and this issue is probably less than 10% of the accrued liability for disabled members. Consequently, this

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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 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. 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 new payroll growth and salary scale actuarial assumptions based on a recent experience study and as approved by the LCPR.

We note 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. 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, we believe the Fund Actuary is reasonably reflecting the withdrawal decrement.

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 with one exception. We note that it appears the Fund Actuary used the current requirement to determine the status of inactive members who are not currently in-pay. It is our understanding that TRA administers the Fund by applying the law in effect at termination. Because the laws have changed over time requiring Members to have less time in the system to be eligible for deferred retirement benefits, the Fund Actuary's approach

tends to overstate the count by 1,335 lives and accrued liability by approximately $68 million for inactive Members who are vested (or 0.31% of the total accrued liability).

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, 2012 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, 2011 actuarial valuation based upon the 2011-2012 contribution rates. However, we would have preferred to see some analysis in the Fund Actuary's report in arriving at that valuation decision. It remains to be seen if this will continue to be a valid assumption for future valuations when the contribution rates are increased.

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