



**July 1, 2010 Actuarial Review
of the Retirement Systems under the
Minnesota Legislative Commission
on Pensions and Retirement**

March 23, 2011

Prepared by:
Milliman, Inc.

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

ATTN: Mr. Lawrence A. Martin, Executive Director

RE: Actuarial Review of the July 1, 2010 Actuarial Valuation Reports

Ladies and Gentlemen:

The enclosed report presents the findings and comments resulting from a review of the July 1, 2010 actuarial valuations 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). 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. For those funds not shown in the table below, a complete replication of the July 1, 2010 Actuarial Valuations has not been performed.

Funds for Which a Complete Replication of the July 1, 2010 Actuarial Valuation has been performed

PERA General

PERA MERF

MSRS General

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 November 24, 2009.

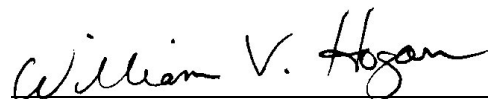
I, William V. Hogan, FSA, am an actuary for Milliman, Inc. I am a member of the American Academy of Actuaries and a Fellow of the Society of Actuaries, and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

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.

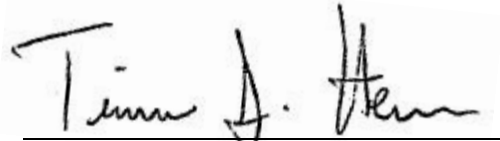
We look forward to making a personal presentation of our findings in briefings to the Minnesota Legislative Commission on Pensions and Retirement and to relevant staff members.

Respectfully submitted,

Milliman, Inc.



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



Timothy J. Herman, FSA, MAAA
Consulting Actuary

WVH/TJH/cw

**July 1, 2010 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, 2010 actuarial valuations prepared for the various statewide and major local Minnesota public employee pension plans. Except as noted below, our reviews have been limited in scope and do not reflect a full replication of any individual retirement system.

Funds for Which a Complete Replication of the July 1, 2010 Actuarial Valuation has been performed
PERA General
PERA MERF
MSRS General

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. Because we recently reviewed the 2004-2008 Experience Studies for PERA, MSRS, and TRA, we did not specifically comment on the reasonableness of the assumptions for those systems, but rather focused on the application of the assumptions in the valuation process.

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. As noted last year, all of the funds using an asset smoothing mechanism continue to have significant deferred asset losses. Plan changes enacted in 2010 have resulted in funding ratios and contribution requirements which are significantly improved. However, that improvement may be overstated after considering those deferred asset losses. This issue is explored in more depth later in this section.
2. The three statewide general employee funds, StPTRFA, and MERF (now a division of PERA) have recently completed experience studies and revised assumptions. All of the other funds should consider a similar process. 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 revisions to other assumptions offset the mortality improvement that is expected.
3. 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 changes in these standards last summer, 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. With respect to the three funds for which we prepared replication valuations, we have provided more detail on the differences between the fund actuary's values using beginning of the year decrements and our values using mid-year decrements.

4. Legislation passed last year 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 2010 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. However, we believe that there are issues that should be addressed before the July 1, 2011 actuarial valuations. These issues are discussed in greater detail below.
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 many 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 revised actuarial standards will provide useful information to the LCPR to more fully understand the funding challenges the retirement systems face. We elaborate more on projections in later sections of this report.

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 7/1/2010 actuarial valuation, there have been significant changes to the benefit structure, updates to the actuarial assumptions for four funds, and modifications to the actuarial standards of practice adopted by the LCPR. In addition, the funds have experienced favorable asset returns in excess of 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%. Despite these favorable returns, the July 1, 2010 actuarial valuation results indicate these funds continue to face long term funding challenges.

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”, 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 most funds, the projections indicate the fund will not reach the 90% funding level 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?

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.

Due to the asset smoothing method, there are still significant investment losses yet to be recognized despite the favorable investment returns for the July 1, 2009 through June 30, 2010 fiscal year. Absent additional large investment gains over the next few years, these losses will flow through the asset smoothing method and be recognized. If the assumed rate of return of 8.5% is met on a market value basis, the rate of return will be less than 8.5% on the actuarial value of assets as prior investment losses are recognized and the actuarial contribution rate will increase. The table below shows the ratio of the actuarial value of assets to the market value of assets as of July 1, 2010.

	Actuarial Value (in thousands)	Market Value (in thousands)	Ratio
MSRS General	\$ 8,960,391	\$ 7,692,531	116%
MSRS Correctional	603,863	525,245	115
MSRS State Patrol	567,211	488,870	116
MSRS Elective State Officials	214	214	100
MSRS Legislator	26,821	26,821	100
MSRS Judges	144,728	126,201	115
PERA General	13,126,993	11,338,582	116
PERA Correctional	242,019	211,368	115
PERA P&F	5,188,339	4,453,737	116
PERA MERF	844,033	844,033	100
TRA	17,323,146	14,917,240	116
DTRFA	255,309	192,403	133
SPTRFA	\$ 1,001,444	\$ 815,307	123%

In understanding the impact of the deferred losses, one consideration is where the systems would be if the market value of assets were used now. The reports by the fund actuaries contain such an analysis. Another way to look at this is to consider what future returns would be required to “undo” the current deferred losses. For illustration, we have calculated the approximate return on market value of assets required over the next several years so the resulting market value would equal the July 1, 2010 actuarial value increased with an 8.50% rate of return each year. In the July 1, 2009 valuations, the ratio of actuarial value of assets to market value of assets was about 130%. Due to the recognition of asset losses and favorable asset return for the 2010 fiscal year, this ratio is about 115% in the July 1, 2010 valuations. Our calculations make some simplifying assumptions and are applicable for those systems where the ratio of actuarial to market value is approximately 115% or 130%. The table below summarizes the required return over various time horizons.

Years of Higher Return	Annual Rate of Return Required for a System with Actuarial Value of Asset to Market Value of Assets Ratio:	
	130%	115%
3	19.0%	16.0%
5	15.0	12.0
10	12.0	10.5
15	11.0%	9.9%

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

Last year, we discussed ASOP 44, Selection and Use of Asset Valuation Methods for Pension Valuations. 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 asset valuation method for all of the valuations is set in statute and all of the plans we reviewed followed the methodology in calculating the actuarial value of assets as of the valuation date. As noted last year, some public retirement systems utilize the concept of a “corridor”, which provides that once the initial determination of the actuarial value of assets is made it is compared to a corridor around market value. There is no required range for the corridor, but the most common corridor has been 80% to 120% of market value (at least prior to 2010). Using this corridor as an example, if the initial actuarial value lies above 120% of market value or below 80% of market value, the final actuarial value of assets is set equal to the boundary of the corridor. Please see the example repeated from last year’s report below:

1. 7/1/09 Market value of assets: \$6,897,118
2. 7/1/09 Initial Actuarial Value of Assets: \$9,030,401
3. Corridor Values
 - A. 120% of Market Value \$8,276,542
 - B. 80% of Market Value \$5,517,694
4. 7/1/09 Final Actuarial Value of Assets: \$8,276,542
(2) but not more than (3A) nor less than (3B)

Due to the asset returns from last year and the prior losses that have now been partially recognized, the Actuarial Value of Assets for most of the funds would now be within an 80% to 120% corridor.

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.

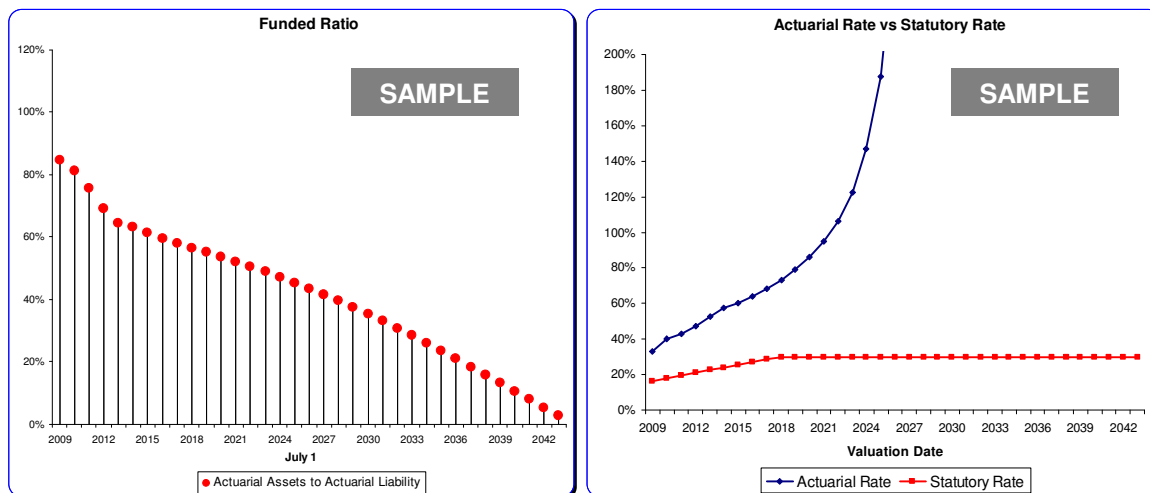
The table below summarizes the key results reported by the fund actuaries on both the Actuarial Value of Assets (AVA) and Market Value of Assets (MVA) basis:

	Accrued Liability Funded Ratio		Chapter 356 Required Contributions	
	AVA	MVA	AVA	MVA
MSRS General	87%	75%	10.99%	13.90%
MSRS Correctional	71	62	25.43	27.69
MSRS State Patrol	83	72	33.84	41.05
MSRS Judges	60	52	31.66	34.45
PERA General	76	66	12.46	15.01
PERA P&F	87	75	25.52	31.00
PERA Correctional	97	85	13.21	15.00
TRA	78	68	15.71	19.30
DTRFF	82	62	13.22	20.31
SPTRFA	68	55	19.84	24.32

* The MSRS Elective State Officials, MSRS Legislators, and PERA MERF funds have been intentionally omitted from the above table because the valuation results are prepared on the MVA basis.

While this is very useful information, it does not fully illustrate the long-term funding trend of the System. In our work with other public plans, we have found the use of computer models to be valuable, particularly when certain parameters like investment return and contribution rates can be varied. Projections using these models and showing alternate investment scenarios can provide the Commission with a better understanding of the long-term financial health of the system and allow for more proactive analysis. We believe this is critical information for the Commission to have in evaluating the long-term sustainability of each Plan. The actuarial standards adopted by the LCPR in August 2010 require valuation projections be prepared for MSRS General, PERA General, and TRA in connection with the July 1, 2011 actuarial valuations.

Sample screen shots from some of the models Milliman has produced for our public plan clients are shown below just to illustrate the value of this type of information.



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.

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 will apply 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, 2010 actuarial valuations, five funds (MSRS General, PERA General, 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, 2010 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, 2010 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, 2010 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.

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 an increase in the accrued liability funded ratio and a decrease in the contribution rate deficiency using the actuarial value of assets. The projected benefit funded ratio reported by the fund actuary showed a significant improvement. As noted below, the fund actuary has included the scheduled contribution rate increases of 2% phased in over the next two 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. Also, when comparing the market value of assets to the actuarial value of assets, there are significant 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 1983 Group Annuity Mortality table with some level of setback. We believe 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).

In general, we believe that most of the July 1, 2010 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

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 15 sample life calculations (9 active including 1 detailed trace life, 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 most of the sample lives. However, in some instances, the values were a little too far apart from ours. Upon further review, we determined the differences were related to benefits provided under Tier I and Tier II as follows:

It is our understanding that an active member under the Old benefit structure may receive retirement benefits that are the largest benefit provided by (1) the Old benefit structure, (2) Tier I of the New benefit structure, and (3) Tier II of the New benefit structure. In addition, it is our understanding that an active member under Tier I of the New benefit structure may receive retirement benefits that are the larger of (1) Tier I of the New benefit structure and (2) Tier II of the New benefit structure. It is our understanding the fund actuary's approach for active members eligible for Old or Tier I benefits is to determine all values under the Tier I benefits.

Based on our estimates of the Tier II benefits for these sample lives, the projected Tier II benefits provide a higher benefit than Tier I at expected retirement ages between 62 to 64 and later. The exact timing of the “crossover” from Tier I to Tier II varies for different individuals. The differences in present value of benefits do not appear to be large in most cases and will apply for a small portion of the liabilities. However, we can not confirm that this issue would be insignificant. The actuarial standards of practice adopted by the LCPR require that the fund actuary value all statutory benefits. Clearly, this issue should be corrected in future actuarial valuations.

For a member with deferred vested retirement benefits, the fund actuary did not apply augmentation to the deferred annuity benefit reported by the fund administrator. In this sample life, the fund administrator reported the member is eligible for a Combined Service Annuity. It is our understanding that the fund actuary applied the Combined Service Annuity load factor that is applicable to deferred vested members in lieu of applying the otherwise required augmentation because the member’s benefits under the fund will be determined using the Average Salary applicable under the Combined Service Annuity provisions. From our prior knowledge of the development of the Combined Service Annuity load factors, we do not believe this application of the factors is as intended. When these factors were developed, the fund administrators did not track data on members who may be eligible for the Combined Service Annuity provisions. It may be prudent to perform a special study to review what data is available, the appropriateness of the Combined Service Annuity load factors, and develop a new set of assumptions and/or valuation procedures, if warranted.

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.

As discussed in Section 8, new actuarial assumptions were used in the Teachers Retirement Association based on a recent experience study and as approved by the LCPR. As mentioned by the fund actuary and in the actuarial report section below, it seems reasonable for a new experience review to be performed. For example, we note that the base mortality table for TRA is the RP2000 mortality table, and the base mortality table for DTRFA is the 1994 Group Annuitant Mortality Table. We expect the mortality assumption may need to be updated when the next experience study is performed.

In addition, the actuarial assumptions description regarding the treatment of unknown data is somewhat vague. We might 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. One minor note is that the summary should reflect the new vesting requirement of five years of service for new hires after June 30, 2010.

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 as we recommended last year. 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 increases of 2% phased in over the next two years in this measure. If these contribution rate increases were not included in the calculation, the projected benefit funded ratio would be 98.04% compared to the 102.06% reported in the actuarial valuation.

Section 4: Minneapolis Employees Retirement Fund

Audit Conclusion

As the LCPR knows well, the funding status for this Fund is seriously deficient. The actuarial valuation report prepared by the Fund actuary clearly shows this. Based on the replication valuation we performed as of July 1, 2010, we believe the core actuarial calculations which support this conclusion are accurate. We believe that the overall strategy for funding MERF should be reviewed. It may also be appropriate to add a cash flow solvency test to the actuarial valuation process. A separate report on the replication valuation for MERF has been provided separately to the LCPR. Please see that report for additional details on the replication valuation.

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>	Effective with the July 1, 2010 actuarial valuation, the asset valuation method was changed to use the market value of assets. Prior to June 30, 2010, non-Retirement Benefit Fund Reserve asset gains and losses were smoothed over a five-year period. We believe the Fund actuary has fairly and correctly presented the actuarial value of assets.
<u>Actuarial Valuation</u>	Based upon our own valuation system results, we were able to match the Fund actuary valuation results on the present value of future benefits and on the actuarial liabilities. Our calculation of Normal Cost based upon the Fund actuary assumptions described below is approximately 6% lower. Due to the high average age of actives, we believe this calculation is more sensitive to valuation differences. For example, we are about 70% higher on the Normal Cost when valued using a mid-year assumption for the occurrence of decrements and the modified retirement assumption. This large difference on a percentage basis is due mainly to the retirement assumption. Since we are very close in our values for total present value of benefits, at issue is how costs are allocated between past and future service. Under the Fund actuary's assumption, members age 61 and older are assumed to retire at the valuation date and have no Normal Cost. Under the assumption that such members retire one year from the valuation date, these members have a sizable Normal Cost. Because the average age for the 143 active members is 60.1, this assumption has a significant impact on the Total Normal Cost. However, the difference in Normal Cost is overshadowed by the level of underfunding.
<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 in our replication valuation results. In addition, the total required contribution follows the methodology provided in Minnesota Statutes 356.215.

Actuarial Assumptions

In general, we believe that the assumptions employed by the Fund actuary 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 Standards for Actuarial Work would allow for either mid-year or end of the year decrement timing for the 2010 actuarial valuations. Upon further discussion with the Fund actuary, it is our understanding that beginning of the year decrement timing is consistent with results published in prior years. Consequently, the use of this timing in the 2010 actuarial valuation should be consistent with prior year results. At the July 8, 2010 LCPR meeting, revised actuarial assumptions for the fund's July 1, 2010 actuarial valuation were approved. Included in these approved assumptions is the retirement rate assumption 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.

We have prepared July 1, 2010 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. 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.

Plan Provisions

We started with the summary of plan provisions for the Fund that Milliman reviewed last year and modified those provisions to reflect the changes enacted due to recent legislation. After reviewing the actuarial report prepared by the Fund actuary, we believe that their summary of plan provisions is consistent with our understanding of the current plan provisions.

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. The information contained in the report appears to be accurate and provides the information in a logical progression. We note that some of the healthy pre-retirement mortality rates reported in the assumptions do not appear to be consistent with the table that is referenced. In particular, the mortality rates for ages under 30 and over 70 are slightly different than the values in the referenced tables. In our discussions with the fund actuary, we understand the fund actuary's firm-wide approach is to use a modification of the referenced table to extend the "white collar adjustment" included in the standard tables. We do not disagree with this approach. However, we recommend the fund actuary modify the description of the table to specify this adjustment. Because this comment only affects the

description of the mortality assumption, there is no impact on the valuation results. On a more “nit-picky” level, we note that the report continues to reference Chapter 422A of Minnesota Statutes. With the transfer of this fund into the Public Employees Retirement Association, we believe these references should be updated to Chapter 353 in next year’s report.

Section 5: Minnesota Public Employees Retirement Association

Audit Conclusion

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

For the July 1, 2010 Actuarial Valuations of the PERA Funds, Milliman prepared a replication audit of the General Fund and sample life audits of the other two funds. Detailed information regarding the replication audit of the General Fund is provided in a separate report; however, we have provided some general comments regarding the result of the replication audit in this report. Commentary and results on the sample life audits for the other two funds are provided below.

In general, the three funds showed modest gains in all of the funded ratios and an improvement in the contribution rate sufficiency/deficiency measure as reported by the Fund actuary. The primary reason for the improvement in the contribution rate sufficiency/deficiency measure is the changes in plan provisions. We note the 0.5% contribution rate increase scheduled to occur effective January 1, 2011 for the General and P&F funds is expected to improve the sufficiency/deficiency measure in these funds. If the assets were valued at market value, there would be a deficiency instead for all three funds. As the prior asset losses are recognized, all three funds will show a deficiency unless substantial market gains occur.

Due to the asset smoothing method, there are significant investment losses yet to be recognized. Absent large investment gains over the next few years, these losses will flow through the asset smoothing method and be recognized. If the assumed rate of return of 8.5% is met on a market value basis, it will result in investment losses on the actuarial value of assets and the actuarial contribution rate will increase. The following chart illustrates the significant difference in key valuation measurements based on market instead of actuarial value of assets.

Public Employees Retirement Association				
	Accrued Liability Funded Ratio		Chapter 356 Required Contributions	
	AVA	MVA	AVA	MVA
General	76%	66%	12.46%	15.01%
P&F	87	75	25.52	31.00
Correctional	97	85	13.21	15.00

With the exception of the General Fund, both of the other funds use the 1983 Group Annuity Mortality with some level of setback. We believe that it is important to note that the funding deficiencies for these funds are 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).

General

Even with the scheduled increases in the contribution rates it is likely that the statutory contribution rate will eventually be less than the required contribution rate as the deferred asset losses are recognized. Absent significantly favorable actuarial experience, the funded status of the plan is expected to decline.

P&F

There is a 1.77% of pay deficiency using the actuarial value of assets, but this amount rises to 7.25% when the market value of assets is used. This is a significant deficiency in the contribution rates. Without increases in the contribution rate, the plan's funded status is expected to drop dramatically absent favorable actuarial experience.

Correctional

Based on the actuarial value of assets, the Plan is 97% funded and the statutory contribution exceeds the required contribution by 1.37%. However, results are very different if the market value of assets is considered. The funded ratio drops to 85% and there is a contribution deficiency of 0.42% of pay. 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 UAAL 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.

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 31 sample life calculations (20 active, 7 in-pay, 4 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 Standards for Actuarial Work would allow for either mid-year or end of the year decrement timing for the 2010 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.
- As part of the replication valuation for the General Fund, we calculated results using midyear decrement timing. The key funding measures for the General fund are shown on the following page:

	Actuarial Valuation as of	
	July 1, 2010 (Fund Actuary)	July 1, 2010 (Milliman Midyear)
<u>Contributions</u> (% of Payroll)		
Statutory – Chapter 353	13.25%	13.25%
Required – Chapter 356	12.46%	12.52%
Sufficiency/(Deficiency)	0.79%	0.73%
Required – Chapter 356 (market assets)	15.01%	15.09%
Sufficiency/(Deficiency) – market assets	(1.76)%	(1.84)%
<u>Funding Ratios</u> (dollars in thousands)		
Accrued Liability Funding Ratio		
Current assets (AVA)	\$13,126,993	\$13,126,994
Current assets (MVA)	11,338,582	11,338,582
Actuarial accrued liability	17,180,956	17,078,595
Funding ratio (AVA)	76.40%	76.86%
Funding ratio (MVA)	66.00%	66.39%

Funding Method

We believe that the actuary has correctly applied the Entry Age Normal funding method as provided in the statutes. Except for the General Fund where we have completed a replication valuation, 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.

With the exception of the payroll growth and salary scale assumption, the valuation results for the general fund were prepared using new actuarial assumptions based on a recent experience study and as approved by the LCPR. We note that the base mortality table for General fund is the RP2000 mortality table, and the base mortality table for the remaining funds is the 1983 Group Annuitant Mortality Table. We expect the mortality assumption may need to be updated when the next experience study is performed.

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.

As noted in the replication valuation for the General Fund, one small technical exception that has no actuarial cost impact is the description of the retirement plan eligibility for Basic Plan Members hired after June 30, 2010. Legislative changes now require five years of vesting. Since new hires generally are Coordinated Members, this provision has no practical impact.

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.

However, we point out that the Actuarial Standards require that the Fund actuary's report should state when the last Experience Study was completed for which the actuarial assumptions are based upon. This does not appear to be provided except for the General Fund.

Also, the reports provide values for projected benefits, actuarial accrued liabilities and normal costs by different decrement types except that they do not provide the split between deferred to retirement age benefits versus expected refunds on the withdrawal decrement for active members. This split is provided for other funds and it would be desirable to have these breakdowns for consistency and comparability purposes.

As noted in the replication valuation for the General Fund, we note that some of the healthy pre-retirement mortality rates reported in the assumptions do not appear to be consistent with the table that is referenced. In particular, the mortality rates for ages under 30 and over 70 are slightly different than the values in the referenced tables. In our discussions with the fund actuary, we understand the fund actuary's firm-wide approach is to use a modification of the referenced table to extend the "white collar adjustment" included in the standard tables. We do not disagree with this approach. However, we recommend the fund actuary modify the description of the table to specify this adjustment. Because this comment only affects the description of the mortality assumption, there is no impact on the valuation results.

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.

Another "nit-picky" item relates to the Highlights on page 1 of the P&F fund report. In the contributions table, reference is made to the statutory contributions under Chapter 353E. We believe that this reference should be Chapter 353 for the P&F fund.

Section 6: 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. As the LCPR is aware and the Fund actuary notes in its reports, the two grandfathered plans face significant funding challenges. However, because they have few members, it is anticipated that the state will not be significantly impacted in making the required benefit payments.

For the July 1, 2010 Actuarial Valuations of the MSRS Funds, Milliman prepared a replication audit of the General Fund and Sample Life Audits of the other five funds. Detailed information regarding the replication audit of the General Fund is provided in a separate report; however, we have provided some general comments regarding the result of the audit in this report. Commentary and results on the sample life audits for the other five funds is provided below.

In general, the four on-going funds showed modest gains in most of the funded ratios and a decrease in the contribution rate deficiency as reported by the Fund actuary. The primary reason for the decrease in the contribution rate deficiency measure is the changes in plan provisions. In addition, the contribution rate deficiency decreased in the General Fund due to the change in the amortization date and in the Correctional Fund due to the increase in statutory contributions. We note the 5% contribution rate increase scheduled to occur effective July 1, 2011 for the State Patrol fund is expected to significantly improve the deficiency measure in this fund. Nevertheless, a significant contribution rate deficiency exists for all of these funds.

With the exception of the General Fund, all the other funds use the 1983 Group Annuity Mortality with some level of setback. We believe that it is important to note that the funding deficiencies for these funds are 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).

Additional discussion of the four on-going funds follows:

Due to the asset smoothing method, there are significant investment losses yet to be recognized. Absent large investment gains over the next few years, these losses will flow through the asset smoothing method and be recognized. If the assumed rate of return of 8.5% is met on a market value basis, it will result in investment losses on the actuarial value of assets and the actuarial contribution rate will increase. The following chart illustrates the significant difference in key valuation measurements based on market instead of actuarial value of assets.

Minnesota State Retirement System*

	Accrued Liability Funded Ratio		Chapter 356 Required Contributions	
	AVA	MVA	AVA	MVA
General	87%	75%	10.99%	13.90%
Correctional	71	62	25.43	27.69
State Patrol	83	72	33.84	41.05
Judges	60	52	31.66	34.45

*Excludes Legislators and Elective Officers

General

The changes made since the July 1, 2009 valuation have significantly improved the contribution rate deficiency. Despite the changes in plan provisions, actuarial assumptions and an extension of the amortization date from July 1, 2020 to July 1, 2040, a small contribution rate deficiency remains. This measure is likely to decline over the next three years as asset losses are recognized and because statutory contributions are less than actuarially required. If market value of assets is used in place of smoothed value, the deficiency worsens by almost 3% of pay.

Correctional

The statutory contribution rate of 20.70% is only 2.39% higher than the normal cost rate and expenses. This situation makes it difficult for the Plan to finance an Unfunded Actuarial Accrued Liability that is large. The deficiency on a market value basis is nearly 7% of pay and that is with an amortization period that extends to 2038. 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 deferred losses are similar in magnitude, as a percent of actuarial liability, to the other plans and the funded status is expected to decline over the next four years, absent favorable experience to offset the losses. The statutory contribution rate is 26.00% while the normal cost rate plus expenses is 23.16%. Most of the contributions are needed to cover the ongoing cost of benefits in the current year (normal cost plus expenses). Therefore, the unfunded actuarial accrued liability will be expected to increase. As the deferred investment losses flow through the smoothing method in addition to the expected UAAL increases, this will likely become an issue. 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 (52% on a market value basis) so the UAAL contribution is nearly as high as the normal cost rate. The Plan has significant deferred investment losses like the other plans which will decrease the funded status and increase the contribution deficiency over the next four years.

Unless otherwise noted, the following comments apply to all six 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. These assumptions should be disclosed in future valuation reports. 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. (The two grandfathered systems use market value for the actuarial value of assets instead of a smoothed value.)

Actuarial Valuation

We reviewed 45 sample life calculations (19 active, 18 in-pay, 8 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 Standards for Actuarial Work would allow for either mid-year or end of the year decrement timing for the 2010 actuarial valuations. It is our understanding that prior year results were provided on this basis so that there is some consistency between years.
- As part of the replication valuation for the General Fund, we calculated results using midyear decrement timing. The key funding measures are shown below:

	Actuarial Valuation as of	
	July 1, 2010 (Fund Actuary)	July 1, 2010 (Milliman Midyear)
<u>Contributions</u> (% of Payroll)		
Statutory – Chapter 352	10.00%	10.00%
Required – Chapter 356	10.99%	10.91%
Sufficiency/(Deficiency)	(0.99)%	(0.91)%
Required – Chapter 356 (market assets)	13.90%	13.80%
Sufficiency/(Deficiency) – market assets	(3.90)%	(3.80)%
<u>Funding Ratios</u> (dollars in thousands)		
Accrued Liability Funding Ratio		
Current assets (AVA)	\$ 8,960,391	\$ 8,960,392
Current assets (MVA)	7,692,531	7,692,531
Actuarial accrued liability	10,264,071	10,156,202
Funding ratio (AVA)	87.30%	88.23%
Funding ratio (MVA)	74.95%	75.74%

Funding Method

We believe that the actuary has correctly applied the Entry Age Normal funding method as provided in the statutes. Except for the General Fund where we have completed a replication valuation, 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.

With the exception of the payroll growth and salary scale assumption, the valuation results for the general fund were prepared using new actuarial assumptions based on a recent experience study and as approved by the LCPR. We note that the base mortality table for General fund is the RP2000 mortality table, and the base mortality table for the remaining funds is the 1983 Group Annuitant Mortality Table. We expect the mortality assumption may need to be updated when the next experience study is performed.

As noted in the replication valuation for the General Fund, 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.

As noted in the replication valuation for the General Fund, one small technical exception that has no actuarial cost impact is the description of early retirement eligibility. Minnesota statute 352.115 appears to allow for early retirement (with reduction) for any age with 30 years of service. Since no members are assumed to retire prior to age 55, the omission of this provision has no practical impact. In addition, the Fund actuary’s report on early retirement omits the change in augmentation from 3.0% to 2.5% for members hired after June 30, 2006 pursuant to Minnesota statute 352.116.

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.

However, we point out that the Actuarial Standards require that the Fund actuary’s report should state when the last Experience Study was completed for which the actuarial assumptions are based upon. This does not appear to be provided except for the General Fund.

As noted in the replication valuation for the General Fund, we note that some of the healthy pre-retirement mortality rates reported in the assumptions do not appear to be consistent with the table that is referenced. In particular, the mortality rates for ages under 30 and over 70 are slightly different than the values in the referenced tables. In our discussions with the fund actuary, we understand the fund actuary’s firm-wide approach is to use a modification of the referenced table to extend the “white collar adjustment” included in the standard tables. We do not disagree with this approach. However, we recommend the fund actuary modify the description of the table to specify this adjustment. Because this comment only affects the description of the mortality assumption, there is no impact on the valuation results. We also note the disabled mortality rates reported in the assumptions for the Correctional fund do not appear to grade into the healthy post-retirement mortality assumption as stated previously in the summary of actuarial assumptions section. On a more “nit-picky” level, we note that the reported salary increase assumption for

ages 45, 50, 55 and 60 are incorrect. After discussing with the Fund actuary, they have been confirmed to be typing errors and that the valuation results are accurate.

One other “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.

Section 7: 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 suffered a modest decline in the accrued liability funded ratio and an increase in the contribution rate deficiency using the actuarial value of assets as reported by the Fund actuary. 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. The fund actuary has also provided a brief summary paragraph of the funded ratio and contribution sufficiency on a market value of assets basis to help the LCPR understand the implications as the deferred asset losses are recognized over the next five years (as required by the Actuarial Standards). As these asset losses are recognized, the contribution rate deficiency is expected to increase.

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. However, we note a 6% change in the reported accrued liability for deferred vested members is less than 0.25% 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.

We note the issue reported last year involving an active Basic Plan member's years of credited service in excess of 40 appears to have been corrected.

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.

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 and appear to be reasonable at this time.

Our initial review concluded that an experience study had not recently been performed. The Fund actuary correctly noted that an experience review was completed in 2007 and adopted in 2008. However, the actuarial report did not disclose this information.

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.

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

Also the description of assumptions should reflect the date of the last Experience Analysis on which the assumptions are based. As noted above, this information can be relevant for assessing the valuation results.

We also note that the Actuarial Standards require more detailed information regarding benefit or assumption changes if the changes are material. The benefit change reduced the Actuarial Accrued Liability by approximately 1.2% while the assumption change was an increase by a much smaller amount.

We would also like to applaud 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 89.54% compared to the 93.79% reported in the actuarial valuation.

We also note the fund actuary has changed the assumed decrement timing for withdrawals and retirements from mid-year to the end of the year. This timing is permitted by the Standards of Actuarial Work and appear to be applied correctly.

One other suggestion would be a preference to have the assumptions and plan provision sections show a summary of the changes. We recognize that those changes were described in the front section of the report; however, we believe that providing that summary in the relevant sections would enhance the report content.

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.

Section 8: 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.

In general, the fund experienced increases in the funded ratios and a decrease in the contribution rate deficiency. The primary reasons for the improvement in the contribution rate deficiency measure is the change in plan provisions. The fund actuary has also shown many of these results on a market value of assets basis to help understand the implications on the contribution rate deficiency as the deferred asset losses are recognized over the next three years. We note the 4% contribution rate increase scheduled to be phased in over four years is expected to significantly improve the deficiency measure in this fund.

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 16 sample life calculations (10 active including three detailed trace lives, 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 limited review, we believe the actuarial calculations summarized in the actuary's report are reasonably accurate with two items noted below.

The first item involves 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 issue is not likely to significantly impact the actuarial valuation results.

The second item involves one sample life for an active Coordinated Member. It appears the member was valued using the projected retirement benefit. Our reading of the actuarial standards would base the actuarial present value of projected benefits on the greater of the member's contributions accumulated with interest and the present value of the member's projected retirement benefit. In this case, the value of the member's contributions accumulated with interest produces the greater value. We believe the actuarial standards require this comparison for terminations that are expected following the member's vesting date. Since this sample life's demographic characteristics are unique (age 65 with 6 years of service), this issue is not likely to produce significantly different results than are calculated by the fund actuary. Consequently, we do not view this as a significant issue.

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.

With the exception of the payroll growth and salary scale assumption, the valuation results were prepared using new actuarial assumptions based on a recent experience study and as approved by the LCPR.

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. As an improvement, we recommend the summary of plan provisions included in future valuation reports be modified to make the death benefit feature of the disability benefit clear.

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.

We also note the fund actuary uses beginning of the year decrement timing. The Standards of Actuarial Work allow for mid-year or end of the year decrement timing. It is our understanding that the beginning of the year timing was used in the prior year so that the results will be consistent between years.

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, 2011 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.

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