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Janice Mueller
State Auditor

June 1, 2006

Senator Carol A. Roessler and
Representative Suzanne Jeskewitz, Co-Chairpersons
Joint Legislative Audit Committee
State Capitol
Madison, Wisconsin 53702

Dear Senator Roessler and Representative Jeskewitz:

The Legislative Audit Bureau is required by statute to contract for the performance of an actuarial audit of the Wisconsin Retirement System (WRS) at least once every five years. An actuarial audit requires a high level of expertise in a technical area in which Audit Bureau staff do not have specialized technical skills.

After a formal request-for-proposal process, the Audit Bureau awarded a contract to an actuarial firm, Milliman, Inc., to perform the audit. Milliman has had experience conducting audits and performing other actuarial services for other public retirement systems. It also conducted the actuarial audits of the WRS in 1991 and 2001. The scope of audit services provided in this contract primarily focused on an independent verification and analysis of actuarial assumptions and valuations of the WRS. As part of this analysis, Milliman reviewed whether the provisions of 1999 Wisconsin Act 11 had been correctly incorporated into the WRS' actuarial valuations. The firm also reviewed the creation of the WRS market recognition account and the related phase-out of the transaction amortization account.

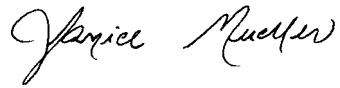
Enclosed is the actuary's audit report, much of which is quite technical, and a response from the Department of Employee Trust Funds and its consulting actuary, Gabriel, Roeder, Smith and Company (GRS). The findings, conclusions, and recommendations in the report are those of Milliman. Although we managed the audit contract, Audit Bureau staff were not involved in the fieldwork, analysis, or writing of the audit report.

Milliman found the statutorily required actuarial method used to determine WRS liabilities and funding requirements to be reasonable and appropriate. Further, Milliman concluded that the WRS' actuarial functions were being adequately performed by GRS and that the WRS actuarial assumptions are reasonable. However, Milliman does offer suggested improvements, ranging from projecting improvements in future mortality rates in the actuarial valuation for current employees to more fully describing benefit plan provisions in the actuarial reports.

Senator Carol A. Roessler and
Representative Suzanne Jeskewitz, Co-Chairpersons
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We would like to acknowledge the professional manner in which Milliman staff carried out the audit, as well as the cooperation provided by the staff of the Department of Employee Trust Funds and GRS to Milliman staff.

Respectfully submitted,

A handwritten signature in cursive script that reads "Janice Mueller".

Janice Mueller
State Auditor

JM/DA/bm

Enclosures

**Actuarial Audit
of the
Wisconsin Retirement System**

May 22, 2006

Prepared by:

MILLIMAN, INC.

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May 22, 2006

State of Wisconsin Legislative Audit Bureau
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RE: WRS Actuarial Audit Report

Ladies and Gentlemen:

The enclosed report presents the findings and comments resulting from a detailed review of the actuarial services being performed by Gabriel, Roeder, Smith & Company (GRS), the actuary retained by Employee Trust Funds for the Wisconsin Retirement System. Milliman, Inc. was requested to undertake this review project in November of 2005. An overview of our major findings is included in the Executive Summary section of the report. More detailed commentary on our review process and some suggested considerations for refinements in actuarial procedures or presentations are included in the latter sections.

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 retained 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 State of Wisconsin Legislative Audit Bureau in their appropriate oversight role with regard to the Wisconsin Retirement System. It has been prepared using multi-faceted review techniques. These techniques include specific validation of a sampling of calculations. A complete duplication of the December 31, 2004 Actuarial Valuations has not been performed.

In preparing this report, we relied, without audit, on information (some oral and some in writing) supplied by GRS and the WRS staff. 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.



We would like to thank Mr. Norman Jones and Mr. Brian Murphy and their staff at Gabriel, Roeder, Smith & Co. as well as Mr. Bob Willett of the Department of Employee Trust Funds and his staff for their cooperation. Their responses to our questions and requests for information made the completion of this project possible.

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.

I, William V. Hogan, F.S.A., 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, F.S.A., 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 Employee Trust Funds Board, the Wisconsin Retirement Board, the Teachers Retirement Board and to the Legislative Joint Survey Committee on Retirement Systems.

Sincerely,

William V. Hogan, F.S.A.
Consulting Actuary

Timothy J. Herman, F.S.A.
Consulting Actuary

Actuarial Audit of the Wisconsin Retirement System

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Actuarial Audit of the Wisconsin Retirement System

SECTION 1 Executive Summary

Purpose and Scope of the Actuarial Audit Review

The Wisconsin Government code requires the Wisconsin Retirement System (WRS) to have an actuarial audit performed at least once every five years. The primary purpose of the audit is to review the actuarial work performed by the System's actuary to assure the Board of Trustees and other interested parties that the actuarial functions of the System are currently being completed accurately and in accordance with all applicable statutes, policies, and actuarial standards of practice. Secondly, this review is an opportunity to identify areas where current procedures could be improved in order to achieve greater value and understanding from the actuarial services performed.

As requested, the following tasks were performed in this audit:

- ✓ analysis of the appropriateness of the actuarial assumptions;
- ✓ review of the assumptions and methodology for compliance with the funding standards;
- ✓ verification of demographic data;
- ✓ an assessment of the accuracy of the mathematical calculations, including a determination of actuarial accrued liability, normal cost, expected employee contributions and effects of any recent legislation.

Performing an actuarial audit is similar to doing detective work. The auditing actuary is presented with a set of facts, the "clues", and then tries to reconstruct the past events based on the available data. The auditing actuary's information is never as complete or detailed as that available to the retained actuary. Nevertheless, the purpose of the audit is to have the auditing actuary acquire a certain level of confidence that the findings and the results of the retained actuary's work are reasonable and were performed according to generally accepted actuarial standards and principles.

Statement of Key Findings of 2006 Actuarial Audit

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

- ❑ **Membership Data:** We believe that the data maintenance and transmission procedures in place at the WRS provide a solid foundation for good actuarial services. It appears that sufficient review and accurate use of the data after transmission is being made by GRS.

- ❑ **Actuarial Value of Assets:** We have reviewed the calculation of the actuarial value of assets used in the December 31, 2004 valuation. We found the methodology to be reasonable and in compliance with actuarial standards of practice. We believe the Actuarial Value of Assets is consistently applied in accordance with the Market Recognition Account as specified in state statutes. This method of smoothing assets is fairly common in public pension funds. Since 2002, the methodology appears to have operated as intended by smoothing fluctuations in the required contribution rates. The reader should be aware about the possibility of the current smoothing methodology to allow the actuarial value of assets to significantly stray from market value as of any given date. We recommend that the difference between market value and actuarial value of assets should be monitored and the appropriate review undertaken, if warranted.
- ❑ **Actuarial Valuation:** We believe that GRS is performing the actuarial valuation function correctly. We do note some minor valuation differences that we believe should be reviewed by GRS. One example is the use of decrement “rates” by GRS rather than “probabilities” seems to be less common in actuarial practice today and suggest consideration of changing to a probability basis with the next experience study. We have summarized these items in the main body of the report.
- ❑ **Funding:** We reviewed the application of the funding method and find it is reasonable and that it meets generally accepted actuarial standards. Based on the system’s funding methods and assumptions, we believe the actuarial costs are appropriately calculated.

We believe the Frozen Entry Age Actuarial Cost Method as modified by the Experience Amortization Account (EAR) is appropriate for the WRS in light of statutes and needs of the system and that the retained actuary is applying the method properly.

- ❑ **Actuarial Assumptions:** While we did not audit the preparation of the 2000-02 Three-Year Experience Study, we did review the published results and the proposed assumptions. We believe that the actuarial assumptions used in the December 31, 2004 Actuarial Valuation are, in general, reasonable for the purpose of preparing a funding recommendation. We have two suggestions for consideration with the next experience study. First, we suggest that consideration be given to project future mortality improvements in the Actuarial Valuation of the Active Life Fund. However, reserve transfers would continue to use the current mortality rates used in the Retired Life Fund. Second, in the review of the patterns of retirement, we suggest a refinement to look at the incidence of retirement when members are first eligible for unreduced benefits compared to second and later years of eligibility for unreduced benefits.
- ❑ **Specific Audit Request Items:**
 - ✓ We have considered the actuary’s practice of annualizing earnings for participants employed less than a full year, and we believe that appropriate adjustments are being made for the purpose of setting stable contribution rates.
 - ✓ We have reviewed the Market Recognition Account as implemented by 1999 Wisconsin Act 11. The following commentary summarizes our more detailed

commentary found in Section 7. We believe that this method of smoothing earnings and the related phase out of the transaction amortization account is reasonable and consistent with generally accepted actuarial standards and practices. We believe that the method to determine the annual recognition of earnings is appropriate, that it provides a reasonable level of insulation against both positive and negative earnings fluctuations, and that it fits within the more common methods of smoothing used by public plan actuaries. We believe that this method is an improvement to the Transaction Amortization Account method as it relates to both equity of earnings recognition among the various accounts and the impact, if any, on system benefits.

- √ We have reviewed the actuary's practice of applying the gain/loss analysis to only active member accounts. We believe the methodology used is reasonable and consistent. We also note that the analysis provided was thorough and comprehensive. We note what appears to be a significant item in the "Other" loss category is due to the transfer of reserves and liabilities from the active member fund to the retired life fund.
- √ We have reviewed the provisions of 1999 Wisconsin Act 11 and we believe that the actuary has appropriately valued those provisions in the December 31, 2004 Actuarial Valuation. We do note that some provisions of the benefit plan summary in the valuation may not fully describe benefit plan provisions included in the actuarial valuation.

Conclusions and Recommendations

Based on the actuarial assumptions and methods adopted by the Board, we found that the December 31, 2004 valuation

- ... has been prepared using reasonable actuarial assumptions;
- ... has been prepared using a reasonable actuarial funding method, properly applied;
- ... has been prepared by fully qualified actuaries and in accordance with all applicable Actuarial Standards of Practice; and, therefore,
- ... present a fair and reasonable representation of the actuarial accrued liabilities of the WRS; and
- ... determine contribution rates which, in general, are appropriate to satisfy the funding obligations of the WRS.

Consequently, based upon the December 31, 2004 Actuarial Valuation Report, we believe that the actuary's conclusions in the valuation are reasonable and reflect generally accepted actuarial practices.

Actuarial Audit of the Wisconsin Retirement System

SECTION 2 Data Validity

Audit Conclusion

We performed tests on the raw data and compared our results to the GRS results as summarized in the Actuarial Valuation Reports. Based on this review, we feel the data used in the valuation is adequate, appropriate, and complete for the valuation work being completed.

Comments

In order for the retained actuaries to prepare meaningful and credible actuarial work, it is imperative that they receive clean and consistent data from WRS. The first step in our review process was to examine the valuation data used by GRS to prepare the actuarial valuation. We verified that all necessary information was included in the valuation data files, and we checked to assure that the retained actuary was using the proper data fields in their work.

As part of our review, we received complete retiree and active data files and their layouts from DETF. We performed a reconciliation of total counts from these files and were able to match the counts reported by GRS in the actuarial valuation reports for the WRS within reasonable tolerances. For retired lives the specific items reviewed included totals by form of benefit and by amount of benefit between the Fixed and Variable funds. With respect to active members, the specific items reviewed included totals by valuation service group, by annual earnings, by age and by years of service. We also verified money purchase account balances. All totals matched within a reasonable range of tolerance to stated report values (exactly in most cases). We believe that this provides a reasonable degree of assurance that the GRS data is accurate and consistent with the records of the DETF.

As part of the valuation process, GRS cleanses the data file for data discrepancies based upon status codes, salaries, age and combination of age and hire date. This cleansing process appears reasonable and appropriate. As requested, we have reviewed the methodology that GRS uses to annualize the earnings of members with less than one year of service. We believe that this methodology is appropriate and commonly applied by actuaries.

A review of the data file layouts for both active and retired participants indicates that all necessary information to perform the actuarial valuation calculations is present. Data fields appear to be used correctly in the benefit trace calculations and match reasonably well with the benefit calculations for those individuals who were reviewed. We note that GRS is required to manipulate the data file substantially to derive the proper status of a participant in some cases. Given the complexity of the WRS, this is not surprising. For example, active members may be distinguished using data fields for dates of birth and hire, end of year status code, employer codes, salary fields and gender codes.

In performing this review, we relied on data and other information provided by the DETF. We have not audited or verified this data. If this data is inaccurate or incomplete, the results of our analysis may need to be modified.

Overall, our review has given us a high confidence level that the data used by the retained actuary is adequate, appropriate, and complete for the valuation work being completed.

- **Parallel Data Processing:** We performed independent edits on the raw data and then compared our results with the valuation data reported in the December 31, 2004 Actuarial Valuations by GRS. We found our results to be very consistent. A summary is shown in Exhibit 2-1. Note that the “Milliman” column reflects the WRS data after adjustments by Milliman. The “GRS” column reflects the actual data used in the GRS valuation.

**EXHIBIT 2-1
MEMBER STATISTICS**

	GRS	Milliman	Ratio Milliman/GRS
Active Members			
General	238,943	238,962	100.01%
Executive Group & Elected Officials	1,469	1,468	99.93
Protective Occupation with Social Security	18,964	18,967	100.02
Protective Occupation without Social Security	<u>2,709</u>	<u>2,709</u>	100.00
Total	<u>262,085</u>	<u>262,106</u>	100.01
Inactive Members			
General	121,472	121,472	100.00%
Executive Group & Elected Officials	579	579	100.00
Protective Occupation with Social Security	3,419	3,419	100.00
Protective Occupation without Social Security	<u>179</u>	<u>179</u>	100.00
Total	<u>125,649</u>	<u>125,649</u>	100.00
In-pay Status			
Fixed	126,211	126,899	100.55%
Variable	<u>30,270</u>	<u>30,213</u>	99.81
Total	156,481	157,112	100.40%

Actuarial Audit of the Wisconsin Retirement System

SECTION 3 Actuarial Assumptions

Audit Conclusion

The audit of actuarial assumptions was limited to a review of the results presented in the 2000-02 Three-Year Experience Study. In general, we found the 2000-02 Three-Year Experience Study report provided recommended assumptions which were reasonable. We believe the methodology employed by GRS is reasonable and the proposed assumptions were reflective of the experience for the most part. With respect to the economic assumptions, the report provides significant national data to support its conclusions in addition to the experience of the fund. We comment on individual assumptions by category below.

General

The purpose of the actuarial valuation is to analyze the resources needed to meet the current and future obligations of the system. To provide the best estimate of the long-term funded status of the system, the actuarial valuation must be predicated on methods and assumptions that will estimate the future obligations of the system in a reasonable manner. The actuarial assumptions are the cornerstone of the actuarial valuation. An actuarial valuation is a statistical projection of the amount and timing of future benefits to be paid from the retirement system. The assumptions regarding future events heavily impact the process and therefore the financial results.

There is not a set of assumptions that can be labeled as “right” or “correct”. Rather, there is a “range of reasonableness” for each actuarial assumption. Within that range, the selection of the assumption can be considered conservative (more likely to produce actuarial gains) or aggressive (more likely to produce actuarial losses in the future). Put another way, conservative assumptions will tend to provide a higher measure of costs while aggressive assumptions will produce a lower measure of costs.

An actuarial valuation uses two different types of assumptions: economic and demographic. Economic assumptions are related to the general economy and its long-term impact on the system, or to the operation of the system itself. Demographic assumptions are based on the emergence of the specific experience of the system’s members.

In reviewing the assumptions currently used by GRS, we are guided by the Actuarial Standards Board (ASB) Actuarial Standard of Practice No. 4. Actuaries who are Members of the American Academy of Actuaries are required by the standard to consider the reasonableness of each actuarial assumption independently on the basis of its own merits, of its consistency with each other assumption, and of the degree of uncertainty and potential for future fluctuations. Although a set of assumptions in the aggregate may appear to reflect the System’s experience, failing to isolate the individual assumptions can lead to inappropriate results when a particular aspect of the plan or a change in the plan is under review.

Our comments and observations regarding the actuarial assumptions are based on our actuarial judgment and experience with other public retirement systems, as well as a review of the 2000-02 Three-Year Experience Study provided by GRS. A recommendation of change in an assumption does not necessarily indicate that those currently used are inappropriate.

Data for the 2000-02 Three-year Experience Study was prepared annually in conjunction with the gain and loss analysis during the valuation. The methodology employed by GRS involved a number of steps. First, crude rates were developed from the experience data. These crude rates were then weighted by a credibility rating. Trial rates were developed as the average of these weighted crude rates and the current rates. Smoothing of these trial rates was done where it was deemed appropriate resulting in the proposed rates. We find this methodology to be logical and appropriate. It has the advantage of not over-reacting to the experience data of a particular study. As we have mentioned in prior actuarial audits, a possible disadvantage is that this methodology may tend to lag a continuing trend in the data where such a trend exists. Accordingly, GRS has modified their procedures to adjust the proposed rates closer to actual experience when such a trend appears.

Economic Assumptions

The economic assumptions proposed in the Experience Study are summarized below:

Investment Return – Current/Proposed	
Total Rate (Net of Investment Expense)	8.0%/7.8%
Wage Inflation Component	4.5%/4.1%
Real Return Component	3.5%/3.7%

We concur that the Real Return Component should fall within the typical 2%-4% range. We note that the proposed assumptions increase the Real Return Component. While we think this may seem unusual in the current economic climate, we believe that the rate proposed is within the acceptable bounds that we see with other large public systems. We believe that the proposed rates will also satisfy the Actuarial Standards of Practice.

In our work, actuaries are guided by the Actuarial Standards of Practice (ASOP) adopted by the Actuarial Standards Board (ASB). One of these standards is ASOP No. 27, *Selection of Economic Assumptions for Measuring Pension Obligations*. This standard, which was the basis for our review, provides guidance to actuaries giving advice on selecting economic assumptions for measuring obligations under defined benefit plans.

As no one knows what the future holds, the best an actuary can do is to use professional judgment to estimate possible future economic outcomes. These estimates are based on a mixture of past experience, future expectations, and professional judgment. The actuary should consider a number of factors, including the purpose and nature of the measurement, and appropriate recent and long-term historical economic data. However, the standard explicitly advises the actuary not to give undue weight to recent experience.

Recognizing that there is not one “right answer”, the standard calls for the actuary to develop a best estimate range for each economic assumption, and then recommend a specific point within that range. Each economic assumption should individually satisfy this standard. Furthermore,

with respect to any particular valuation, each economic assumption should be consistent with every other economic assumption over the measurement period. The economic assumptions are much more subjective in nature than the demographic assumptions.

Demographic Assumptions

Demographic assumptions predict the movement of members into and out of membership and between status types. The key demographic assumptions are:

- Retiree mortality
- Retirement patterns of active members
- Termination of employment of active members
- Non-economic portion of salary scale (merit scale)

In addition, there are a number of other demographic assumptions used in the valuation which have a less significant impact on results. These include:

- Disability rates
- Mortality among active members
- Retirement from vested terminated status
- Probability of terminating vested members taking a refund
- Percent of active members that are married and age differences between spouses

We reviewed both the current demographic assumptions and the recent changes recommended in the 2000 -02 Experience Study.

Studies of demographic experience involve a detailed comparison of actual and expected experience. If the actual experience differs significantly from the overall expected results, or if the actual pattern does not follow the expected pattern, new assumptions are considered. Recommended revisions normally are not an exact representation of the experience during the observation period. Judgment is required to predict future experience from past trends and current evidence, including a determination of the amount of weight to assign to the most recent experience.

Since we have not independently reproduced the experience study results upon which the current assumptions are based, we can only make general observations about the appropriateness of the assumptions. Based on this review, we have the following observations and comments.

- (1) Demographic assumptions for a very large system such as WRS are normally established by statistical studies of recent actual experience. This is the case for the selection of WRS' assumptions. Even as large as WRS is, a three year study period is a relatively short period. Statistical variations can occur as well as the impact of the economy on termination of employment, retirement and other assumptions.

Since GRS uses a credibility methodology as described earlier, the experience of earlier studies is explicitly taken into account. Subject to the limitation concerning the possibility that this methodology may lag behind emerging trends, we find this methodology to be an acceptable approach.

(2) In the experience study, actual experience during the study period is compared to that expected based on the actuarial assumptions then in use. GRS prepares a columnar comparison of actual experience rates to the assumed (both current and proposed). In other experience studies, this relationship is measured with a ratio of actual experience to expected experience and reflected in a measurement called the A/E ratio. If the A/E ratio is equal to 1.00, the actual experience has been as predicted by the assumptions in the aggregate. If the ratio is greater than 1.00, the assumption has underestimated actual experience and if the ratio is less than 1.00, the assumption has overestimated actual experience. A review of the patterns of the ratios tells not only whether adjustment is needed but provides input on how the adjustment should be made. We suggest that GRS consider providing A/E ratios in future experience studies.

■ ***Withdrawals***

The valuation assumptions use a “select & ultimate” basis for expected withdrawals. This basis assumes higher withdrawals for employees within the select period from their date of hire. After that, an ultimate table is used which is based upon age. We believe this methodology to be appropriate for the WRS. In general, the proposed rates appear to be reasonable based upon the experience data of this study. We note that actual experience for the Protective Without Social Security group exhibits higher rates by age for those with more than 5 years of service. We suspect this may be a random fluctuation, and we agree with the rates proposed by GRS.

■ ***Disability Retirements***

The 2000-02 Three-year Experience Study generally shows lower than assumed rates of disability. One notable exception is the age 50-54 group for protective service members. We also note a similar observation in the prior experience study for the 55-59 age group. We suggest that this observation should be monitored to see if this “spike” occurs again in the 2003- 05 Experience Study. Based upon this observation, we concur with the rates proposed for the December 31, 2004 Actuarial Valuation.

■ ***Service Retirements***

The 2000-02 Three-year Experience Study results demonstrate a pattern of retirement which tracked assumptions more closely than the prior experience study showed. The proposed rates appear to be reasonable based upon the experience data of this study. One possible area to watch are future normal retirement rate patterns for male public school members at the earlier ages. We note also that other systems measure retirement experience on a “select and ultimate” basis relative to the first year of eligibility for unreduced benefits. We suggest that the next study incorporate this analysis for further review.

■ ***Merit & Seniority Salary Component***

The 2000-02 Three-year Experience Study shows a strong correlation between pay increases and service. We believe that the GRS proposed assumptions reflect this data very closely and are reasonable for the December 31, 2004 Actuarial Valuation. We also note a reasonable correlation of pay increases to age. We concur with GRS’s choice of using service related rates. However, rates that are related to both age and service may make sense. Finally, it is interesting to note a small group of protective members with over 40 years of service have averaged very high pay increases. This experience may be evidence of some salary spiking that may be occurring.

■ **Mortality**

Post-retirement mortality experience in the 2000-02 Three-year Experience Study is just slightly lower for males and just slightly higher for females than current rates in the aggregate. In light of this data, GRS has recommended that the same female post-retirement mortality rates continue to be used for the actuarial valuations. Since the post-retirement dividend can be affected by mortality experience that varies significantly from the assumed rates, recommended rates have tended to be very close to experience. Based upon the results from the 2000-02, 1997-99 and the 1994-96 Three-year Experience Studies, we believe that the goal of keeping the recommended rates close to experience has been reasonably successful and is appropriate for the valuation of the Retired Life Fund.

Pre-retirement mortality experience in the 2000-02 Three-year Experience Study tracks reasonably close to the rates adopted for the December 31, 2004 Actuarial Valuation. Given that mortality trends are for continued improvement, some strengthening of this assumption will most likely be needed in the future. Given the close tracking with this most recent experience study, we are comfortable with the proposed assumptions. However, we suggest that consideration to modify the post-retirement mortality table used in the valuation of the Active Life fund may be warranted as described below.

Generally, the WRS Experience Studies have shown improvements in mortality rates. This trend has also been observed on a national level and is expected to continue in the future. Since these trends are expected to continue in the future, we suggest that this expectation be built into the valuation model. One possible approach that would reflect the operation of WRS would be to add an assumption to the Active Life Valuation that future post-retirement mortality tables are changed to reflect future improvements in mortality based on the results of future Experience Studies. Naturally, other approaches are available and may be deemed to be more appropriate. Regardless of the specific approach, we recommend that an assumption of future mortality improvements be incorporated in the Active Life Valuation so that contribution rates are determined that fund for the retiree liability based on expected mortality at the time when the active member retires rather than funding for the retiree liability based on current expected mortality. The methodology described above is a relatively new trend that some public funds have been adopting. We believe that it makes good sense and is more easily provided with current technology. The reader should note that the recommendation only relates to the expected mortality used in the actuarial valuation of the Active Life Fund. We would expect that reserve transfers will continue to be made based on the current mortality rates used in the Retired Life Fund.

Experience Study Report

Actuarial standards of practice require an actuarial report to provide information sufficient to meet two goals:

- (1) the results should be able to be properly interpreted and applied by the person to whom the communication is directed, and
- (2) another actuary should be able to provide an opinion about the reasonableness of the conclusions.

We believe that the 2000-02 Experience Study reasonably meets this standard. As we mentioned above, we would suggest that future reports include the A/E ratios as an additional item of information. Furthermore, we note that the proposed mortality rates for disabled retired lives on page 100 of the 2000-02 Experience Study report include mortality rates that exceed 100% for ages between 101 and 108. We believe that these rates are typographical errors and do not represent the assumptions proposed by GRS.

Actuarial Audit of the Wisconsin Retirement System

SECTION 4

Actuarial Funding Method

Audit Conclusion:

We reviewed the application of the funding method and find it is reasonable and that it meets generally accepted actuarial standards. Based on the System's funding methods and assumptions, we believe the actuarial costs are appropriately calculated.

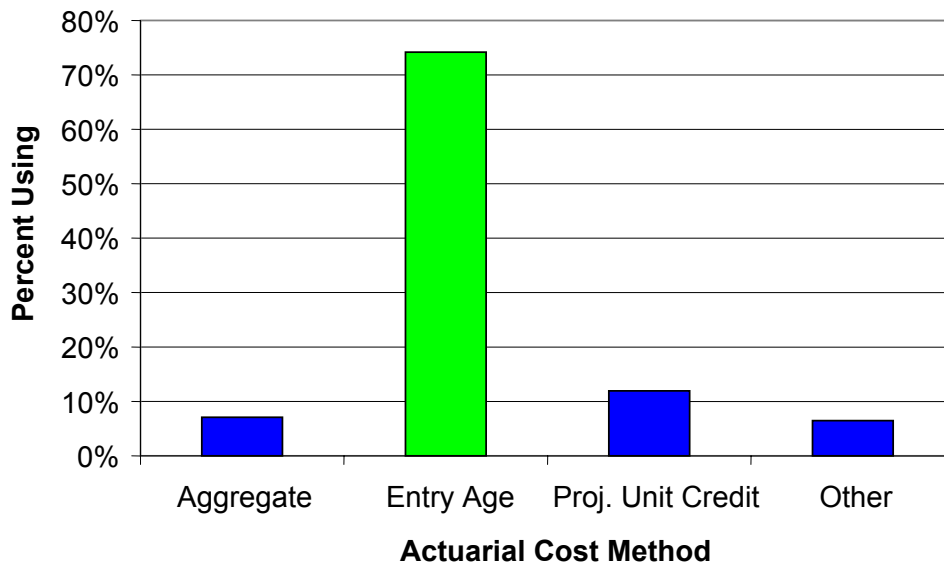
Comments:

Actuarial Cost Method

The purpose of any cost method is to allocate the cost of future benefits to specific time periods. Most public plans follow one of a group of generally accepted funding methods, which allocate the cost over the members' working years. In this way benefits are financed during the time in which services are provided.

The most common cost method used by public plans is the Entry Age Actuarial Cost Method. The focus of the Entry Age cost method is the level allocation of costs over the member's working lifetime. For a public plan this means current taxpayers pay their fair share of the pensions of the public employees who are currently providing services. Current taxpayers are not expected to pay for services received by a past generation, nor are they expected to pay for the services that will be received by a future generation. The cost method does not anticipate increases or decreases in allocated costs.

The 2003 Public Funds Survey shows that nearly $\frac{3}{4}$ of statewide systems are using the Entry Age cost method, as illustrated in the graph below.



Frozen Entry Age Method (modified)

The Frozen Entry Age Actuarial Cost Method (also called the Frozen Initial Liability Method) is being employed in the liability calculations for WRS. This method has been modified to adjust the Normal Cost by the amortization of the Experience Account Reserve (EAR).

Under the Frozen Entry Age Actuarial Cost Method as modified, Normal Costs are determined in the aggregate. The first component of Normal Cost is equal to a level percentage which is determined in the aggregate as the ratio of the present value of future entry age normal costs for all participants divided by the present value of expected future pay for all participants. The second component of Normal Cost is equal to an amortization of the EAR over a period of years. A final component of the Normal Cost is the Benefit Adjustment Contribution (if any).

Each employer group that enters the WRS has an initial unfunded Actuarial Accrued Liability which is frozen. This frozen unfunded liability is amortized as a level percentage of pay over a fixed period of years. This amortization of unfunded is unaffected by gains or losses since those are reflected in the EAR component of the Normal Cost.

We believe that the Frozen Entry Age Actuarial Cost Method (as modified) is appropriate for use by the WRS. While many systems currently use the Entry Age Normal method, the Frozen Entry Age method is a reasonable variation of that method. Use of the level percent of pay approach to amortize the Unfunded Actuarial Accrued Liability is both common and appropriate. Absent future changes in benefits and/or assumptions, this approach should provide a stable and predictable pattern of costs as a percentage of payroll.

Asset Valuation Method

GRS uses an adjusted asset method to develop market-related value of assets as required by statute. This statutory methodology is designed to produce asset values for purposes of the valuation which will track towards market value over the long term but that will avoid the volatility associated with just using market value. The purposes of this methodology is to avoid unnecessary swings in plan costs. Such an approach is commonly used in public pension systems and we agree that such a method is prudent and appropriate for use by the Fund.

Overall, we believe the statutory methodology is being applied by GRS correctly. The theory behind the actuarial value of assets is that the year to year fluctuations will generally be in opposite directions and thus, balance out over time. We note that the method has acted to maintain a more stable level of contribution rates than if the market value of assets were used in the calculation of the contribution rates. We also note that there is the potential for the actuarial value of assets to significantly vary from the calculated market value of assets when measured at any point in time. Since the "pension promises" are paid over a long time horizon and the pension trust funds are not likely to require large scale liquidation at a single point in time, differences between market value and actuarial value of assets may be acceptable when determining required annual contributions for pension funding. However, if the difference between actuarial value and market value becomes too large, there is a concern that the difference is not due solely to random fluctuations and it may be prudent to review the causes of the differences. Based upon the results of such a review, it may be advisable to make an adjustment to the actuarial value of assets. The current methodology does not contemplate such an adjustment nor are we recommending that it should. We are recommending that the difference between the market value and the actuarial value of assets should be monitored and the appropriate review undertaken if the facts and circumstances make that step advisable.

Actuarial Audit of the Wisconsin Retirement System

SECTION 5

Valuation Results

Audit Conclusion

We reviewed a sample of the individual cost and liability calculations of WRS. We found that the significant benefit provisions were accounted for in an accurate manner, the actuarial assumptions and methods are being applied in accordance with standard actuarial procedures, and that the individual liabilities calculated by GRS are reasonable.

Comments

The largest portion of our time and effort in this review process was spent on verifying the detailed valuation results being produced by GRS. The reader needs to appreciate that an actuarial valuation of a pension plan entails hundreds of separate calculations performed for each individual plan participant. Given the thousands of plan participants in the WRS, this means that the liability amounts and contribution rates developed in the overall annual valuation represent the culmination of thousands of calculations. While computers give us the ability to make these large numbers of calculations on a timely basis, they also complicate the checking process. We have attempted to address this issue by looking at a sampling of valuation results from two different perspectives.

Review of Detailed Benefit Trace

For a sampling of active and inactive plan participants, which we selected, GRS produced year-by-year, decrement-by-decrement computer print-outs that allowed us to trace and check individual calculations of projected benefits and liabilities. We reviewed benefit trace information prepared using programming and assumptions for the December 31, 2004 Actuarial Valuation. Our review of the detailed benefit traces confirmed the following important findings:

- (1) GRS valuation procedures are consistent with the major plan provisions. We verified that they are valuing the proper retirement benefits in all categories. With respect to the ancillary benefits, we note the following items that do not appear to be consistent with the summary of plan provisions included in the actuarial valuation report:
 - (a) Death-in-Service Benefit. It appears that there is no liability calculated for Death-in-Service that occurs before certain ages. In one particular case, no liability was calculated before age 40. We note that there was a Death-in-Service liability calculated between ages 40 and 55 that is related to the Money Purchase benefit. On and after age 55, there was a liability calculated that considers both the WRS Death-in-Service Benefit and the Money Purchase benefit. Finally, we note that on and after age 55, we were not able to match the Joint and Survivor Reduction Factor that GRS uses in the calculation of the surviving spouse benefit after age 55.

- (b) Retirement Benefits. It is our understanding that GRS applies an adjustment in certain cases if the “Post-10/15/92 LTDI Plan” disability benefit is larger than the normal retirement benefit. As noted on page 9 of this report, the Experience Study shows a spike in Disability Retirements for Protective Service members who are eligible for retirement benefits. Given that the disability benefits are higher than the retirement benefits in some cases and the observations from the Experience Study, we find this approach to be reasonable. We suggest that this assumption should be disclosed in the valuation report.
- (c) Disability Benefit. In the GRS computer setup, disability benefits are coded separately for either disability benefits under the “Pre-10/16/92 WRS Plan,” or disability benefits under the “Post-10/15/92 LTDI Plan.” The disability benefits included in the samples that we reviewed were not consistent with our reading of the provisions of the “Post-10/15/92 LTDI Plan.” After consultation with GRS, we understand the approach that GRS uses to value these benefits, and we believe that this approach is a reasonable method to determine the actuarial value of the disability benefits. However, we recommend that GRS modify the description of the plan provisions and/or actuarial assumptions to clarify the treatment of disability benefits in the valuation.

We expect that the items that are described above are not likely to materially impact the results of the actuarial valuation.

- (2) GRS is applying all actuarial assumptions as stated in their actuarial valuation report. We confirmed that the assumptions proposed in the 2000-2002 Three-year Experience Study are used in the 12/31/2004 Actuarial Valuations. We noticed the following items in our review of the samples:
 - (a) Decrement Operation. GRS does not apply disability and mortality decrements in the first 5 years of a member’s service. We note that the withdrawal rates that are developed in the Experience Study do not appear to include separations from active service for death or disability. Consequently, we suggest that either future Experience Studies be modified so that the withdrawal rates include all separation from active service in the first five years or that the valuation procedures be modified so that death and disability decrements apply in the first 5 years of a member’s service.
 - (b) Decrement Relativity. GRS uses the decrement rates directly from the Experience Study without adjustments for multiple decrement table effects. The reader should note that a multiple decrement table is an actuarial model which assumes a large body of lives is subject to several independent causes of decrement (e.g. separation from service, death, disability, retirement, etc.) which are operating continuously. The decrement rates that are developed in the Experience Study are developed by isolating a particular cause of decrement. However, in the valuation process, a group of members are exposed to several different decrements that operate simultaneously. Since these decrements operate independently, the probability that a member will leave the group for a given reason is less than the rate of decrement. For this reason, a more common approach that is used by actuaries is to use a probability basis by using multiple decrement theory. We suggest that consideration be given of changing to this basis in the next experience study/assumption change cycle.

- (c) Eligibility Testing. The eligibility for benefits is determined based on the age-nearest-birthday and total service rounded up on the date the decrement is assumed to occur. The present value appears to also be using an annuity factor based upon age-nearest-birthday. In some cases, this methodology results in a member who is not yet at the minimum retirement age being assumed to retire between zero and six months earlier. For example, consider a member who was born on 12/1/50 and has 28 years of service as of 12/31/04. This member is age 54 years and one month as of 12/31/04. Using the actuarial assumptions (in particular, mid-year decrements), this member would be projected to be exact age 56 years and seven months and have 30.5 years of service at 7/1/07. Using the Eligibility Testing methodology described above, the member's age nearest birthday is 57 and service is 31. Consequently, this member would be determined to be eligible for Unreduced Retirement Benefits at 7/1/07. We note that based on this member's age and service, this member would not be eligible for Unreduced Retirement Benefits in the actuarial calculations until 7/1/08. It should be noted that changing this methodology so that retirement first occurs one year later may not improve the estimate of the liability since retirement would first be assumed to occur in this situation at an age greater than 57½ and perhaps using a present value factor at age 58. This second methodology would tend to understate costs while the GRS methodology tends to slightly overstate costs. Since the GRS methodology would seem to be more conservative, we are comfortable with the GRS methodology for purposes of producing a funding recommendation.
- (3) In general, attained age and entry age values seem to be appropriate and reasonable. Since different computer systems handle some minor details differently (such as decrement timing and other so-called "half-year" issues), it is not always possible to exactly reproduce all present value calculations, but none that we checked fell outside of a reasonable tolerance.
- (4) We looked at the calculation of projected average salary and projected average benefit service. Timing issues were properly and consistently applied; all results appeared to be correct and appropriate.
- (5) We specifically reviewed the valuation procedures for members who transfer between divisions. GRS has developed procedures to calculate liability for members in these circumstances. These procedures are to determine the total liability in two parts. First, part of the liability for the member is determined in the division in which the member is currently active. This liability determination takes into account the member's current salary and current credited service in the determination of the amount of the benefits in the member's current division and considers prior service plus current service in the determination of the member's eligibility for benefits. This part of the liability is split between future service and past service liability. Second, part of the liability for the member is determined for the division(s) in which the member has prior service. GRS indexes the member's Final Average Earnings from the prior division based on the assumed salary scale and determines the liability assuming that the member retires at the earliest age at which the member is eligible for unreduced benefits in the new division. This second part of the liability is considered only as past service liability. We find this methodology to be a reasonable approach to this situation. However, we note that there are two aspects of this approach that may warrant modification. First, this approach results in the assumption that different pieces of the member's benefits go into pay at different times since the portion of the liability for the member's current division is subject to assumed rates of retirement

whereas the portion of the liability for the member's prior division(s) is assumed to be paid at a single assumed retirement age. Second, this approach results in the calculation of Final Average Earnings that will likely be different for the benefit calculated in the current division compared to the prior division(s) as the member's actual salaries differ from those included in the assumptions. If the benefits for members in these circumstances do in fact go into pay at the same time and use the same Final Average Earnings at the actual retirement date, we suggest that consideration be given to modify this approach to harmonize these two items.

New Retiree Comparison

One of the questions which is of some concern in assessing the accuracy of the actuarial work being performed is, "Is the actuary's understanding of how the plan provisions work consistent with actual plan administration practices?" The method that we use to attempt to address this concern involves detailed analysis of a sampling of participants who change status from one valuation to the next. In particular we like to focus on new retirees to see if the benefit liability after actual benefit calculations have been made is consistent with the benefit liability predicted based on the active member valuation data from the preceding valuation. This approach can often identify discrepancies that would not be found through normal checking nor even through parallel valuations.

What we looked for, what we found, and the possible implications are discussed below:

- (1) **Salary Discrepancies.** Final average salary for benefit purposes can deviate from projected final average based on valuation data for three common reasons: (a) bad data; (b) salary spiking (a phenomenon where a worker approaching retirement works extra hours and/or receives a late career promotion in order to increase the salary in the final year or two by amounts more than expected); or (c) some participants may have had an earlier period of high earnings such that the salary in the last year or two is not part of the salary averaging period used for benefits. In the sampling of new retirees we checked, we found one recent retiree where the actual Final Average Salary was substantially higher than what would have been projected in the prior year's valuation. This salary spiking created retiree liability for this member that was more than 30% higher than the expected liability from the prior year's valuation. This phenomenon may warrant more detailed review in the next Experience Study or in a separate project.
- (2) **Service Discrepancy.** When someone actually retires, there may be adjustments made to an individual's service credits. These can arise from purchased credits (e.g. military service or other "buy-backs"), added credits (sick leave, vacation, etc.), or corrections in credited service (due to rehires, transfers, or simply corrected errors). In the sample of retiree calculations we reviewed in detail, we did not find any examples of service discrepancy.
- (3) **Accrued Liability.** In most of the cases which we reviewed, we noticed that the present value of the retirement benefit exceeded the active participant accrued liability for that individual from the prior year. This is to be expected in this comparison because the retirement age assumption was not 100% for those cases which we reviewed. Overall, we did not observe anything out of the ordinary except as noted above.

Comments on Benefit Calculation Process

An added benefit to reviewing a sample of new retirees is that we can look at the benefit processing procedures in place at the System. We received two sample benefit calculations from DETF for this purpose. Our review of both of these calculations provided assurance that the actuarial liability calculations prepared by GRS are reasonably consistent with actual costs at retirement.

Actuarial Audit of the Wisconsin Retirement System

SECTION 6

Reports: Contents and Presentation

Audit Conclusion

We believe that the actuary's conclusions in the valuation report are reasonable and reflect generally accepted actuarial practices and applicable standards of practice.

Comments

While the "*correctness*" of the actuarial work product is, of course, the primary focus of an actuarial review, we believe that the communication of those results to both the lay reader and other professionals is also an important consideration in evaluating the quality of actuarial service provided. Below we share some reflections and comments on the actuarial work product and the Experience Study that were the subject of this review:

December 31, 2004 Actuarial Valuation Report

Due to the unique nature of the Wisconsin Retirement System, GRS prepares separate reports with respect to the active members versus the retired members. With respect to the active member valuation report, we find the style and content of the GRS report to be generally readable and adequate. Considerable general background information is included for the education of the lay reader. The graphical presentations are good. Both historical data and future projections help to place the current valuation in the context of the long-range funding tool that it represents. The contribution charts are very informative and present a good picture of benefit cost levels. The development of the contribution rates in the valuation results section is easy to follow and appears to provide sufficient detail about the calculation process.

After completion of the last actuarial review, some minor report quality items were identified in our report. We are pleased to note that many of those items have been incorporated in the current valuation report. With that said, we have noted a couple of general comments which we would like to point out in the spirit of continuing to improve the quality of the work product:

- In the valuation and financial sections of the report, there are various tables which appear to incorporate the same line items however the values do not agree. It may be intended that these items do not match due to certain components being included or excluded. We would suggest that these line items be labeled differently or the differences noted in a footnote. For example, the Employer Reserve on pages I-17 and I-18 do not match.
- We believe that the summary of plan provisions could be better expanded to clarify certain provisions of the plan such as the normal form of benefit provided at retirement, a more thorough description of the interest crediting, particularly between the fixed and variable funds, and an added description of the disability benefits for protective employees.

The fact that the current report does not include these items does not suggest that they are incorrect or deficient. We do believe that their inclusion would enhance the work product.

With respect to the retired member valuation report, we find that sufficient information is contained in this report concerning the required reserves for the fixed and variable annuities. Significant data is provided by annuity type. It appears that the actuary has properly analyzed the post-retirement adjustments for the fixed and variable annuities in accordance with chapter sections 40.27(2) and 40.28(2) as described in the actuarial valuation report.

2000-02 THREE-YEAR Experience Study

In general, we found these reports complete and easy to read. The presentation of results was clear as were the recommendations. We especially like the graphical summaries. As noted earlier, we suggest adding A/E ratios to the presentation of results.

Annual Gain/(Loss) Analysis

We have reviewed the report prepared by GRS relative to the components of the annual gain or (loss) for the year. It is our understanding that this report is prepared based upon a comparison of this year's valuation data and the valuation data for the prior year. This is a natural progression toward ultimately completing the next three year experience investigation.

Our review of this report has lead us to conclude that it is accurate, thorough and well documented. The report leads into the major sources of gain or (loss) and then "lumps" the rest into a category known as "other". With many major systems that we have seen, the typical analysis on an annual basis stops there. GRS has taken this report to the "next step" by identifying many of the sources of gain or (loss) in this "other" category.

We do have one important point to mention that leads into our next section. From reviewing the Annual Gain/(Loss) Analysis, it is clear to us that the system continues to incur a fairly sizable "other" loss. Looking further into the sources provided, it seems evident that a major source of this "other" loss is an imbalance that seems to occur between the release of expected liabilities from the active fund relative to the actual asset transfer that is made to the retired lives fund. This imbalance can occur for many reasons and some of those reasons have been alluded to earlier in this report. Our next section will explore those issues in more depth.

Technical Requirements for the Report

The communication of actuarial valuation results for pension plans is covered in the Actuarial Standards Board (ASB) Standard of Practice No. 4, *Measuring Pension Obligations*. Generally, sufficient information should be presented such that:

- it would be properly interpreted and applied by the person or persons to whom the communication is directed, and
- another actuary in 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 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 the WRS valuation report meets these requirements.

Actuarial Audit of the Wisconsin Retirement System

SECTION 7

Act 11 and Reserve Transfers

Audit Conclusion

Comments

As part of this report, we were requested to review the provisions of 1999 Wisconsin Act 11 and to form an opinion as to whether these provisions have been correctly provided into the actuarial valuations. Some of the more significant provisions of Act 11 provide for the following:

- (1) A reduction in the formula benefit accrual rates for service after December 31, 1999;
- (2) A change in the interest credits to member accounts in the fixed fund and a re-opening of the variable account.
- (3) Implementation of the Market Recognition Account and an orderly recognition into assets of previously unrecognized amounts in the Transaction Amortization Account.

We believe that the December 31, 2004 Actuarial Valuation has correctly applied these changes. We believe that the summary of plan provisions could be clarified to more completely describe the interest credits on member accounts.

With respect to the Market Recognition Account, we have reviewed the following items as requested in the Request for Proposal.

- (1) The smoothing methodology of the Market Recognition Account uses the actuarially assumed rate of investment return to determine the amount of investment income to be recognized annually. We find that the use of the actuary's investment return assumption as a starting point for income recognition makes logical sense since it represents the current "best" estimate. Moreover, we believe that the use of the investment return assumption is the appropriate rate to use to measure asset gains or losses to be subsequently recognized since that rate is used to measure plan costs.
- (2) Under the Market Recognition Account, negative earnings are treated the same as positive earnings. We believe that this treatment is appropriate and consistent with actuarial standards of practice. Furthermore, we believe that the Market Recognition Account effectively insulates the Actuarial Value of Assets used for contribution rates against a period of excess returns above those assumed to be earned or against a period of lower returns below those assumed to be earned. We note that for a few years after a period of lower returns ends, it will be necessary to achieve higher returns than the actuary's assumed rate of investment return in order to avoid asset losses when measured on an actuarial value of assets basis. The converse would be true after a period of higher returns. This necessary result of the smoothing mechanism is to be expected. It should also be noted that a prolonged period of excess earnings above the

assumed rate will result in an actuarial value of assets that consistently lags behind the market value of assets. Conversely, a prolonged period of lower earnings below the assumed rate will result in an actuarial value of assets that consistently exceeds the market value of assets.

- (3) It is our understanding that the Market Recognition Account operates within the Fixed Income Investment Trust. Based upon the December 31, 2004 Actuarial Valuation, the Fixed Income Investment Trust constitutes around 95% of the total plan assets. With the December 31, 2004 Actuarial Valuation, the phase-in of the Transaction Amortization Account is complete. Going forward, the Market Recognition Account will impact the recognition of earnings for most of the system assets. We do note that the timing of earnings recognition may modestly affect some benefits (i.e., money purchase benefits in the year of retirement, post-retirement dividends prior to death, etc.). While there is some impact, we believe this methodology is reasonable and does not inherently cause inequities among the membership in total.
- (4) As we mentioned in (3) above, the level of interest crediting on money purchase benefits and the level of post-retirement dividend may be modestly affected by the earnings recognition in the Market Recognition Account. However, over the long term, we expect the smoothing mechanism will result in the payment of post-retirement dividends that are consistent with the investment earnings in the Retired Life Fund. In addition, the smoothing mechanism may affect the timing of when the actuarial valuation produces a member contribution rate that is lower than the normal contribution rate level thus reducing the contribution credit to a member's account (the de-coupling issue raised by GRS).
- (5) Reviewing a 2004 survey by NASRA, we discovered that 76 of 127 public retirement systems employ an actuarial valuation of assets that smooth earnings fluctuations over a five-year period. Based upon this data, we are comfortable in saying that the Market Recognition Account methodology reflects an approach that is commonly employed by similar public pension systems.

We were also charged with commenting on the Actuarial Gain/Loss methodology. We have reviewed both the methodology and the results of the 2004 actuarial gain/loss report.

First, we believe that the methodology employed by GRS for preparing a gain/loss evaluation is appropriate and correct. In our opinion, the fact that it only reviews the active member calculations does not invalidate its results. Since the actuarial gains and losses in the Retired Life Fund affect the dividend that is payable from the Retired Life Fund and do not affect the contributions that are required in the Active Life Fund, we believe that this approach is appropriate in light of the operation of the Active Life and Retired Life Funds in WRS.

Second, in the 2004 Gain/(Loss) Analysis, GRS calculates the actuarial gain/(loss) associated with several different risk areas and summarizes these results on page 9 of the 2004 Gain/(Loss) Analysis. The largest item in this summary is the loss reported in the "Other Activity" category. We note that GRS has performed a detailed review of the components that are included in the "Other Activity" category. This more detailed review is included on page 10 of the 2004 Gain/(Loss) Analysis. This presentation approach may have the effect of drawing the reader's attention away from certain items that are significant risk areas for the Fund. We recommend that the presentation of the results in future Gain/(Loss) Analysis reports be modified to present the entire analysis in one table rather than two separate tables.

Third, it is evident that a continuing source of “other” losses is the difference between “Expected Reserve Transfers” and “Actual Reserve Transfers” that occur when a member retires. This loss has appeared to occur in every year since our last review. Clearly, the costs that are projected by the actuarial assumptions are not matching up with actual costs in this risk area. As previously noted, we believe that the regular actuarial assumptions provide a reasonable model of future experience for the specific items that have been measured in the Experience Study process. It appears that the emerging experience differs from that projected by the actuarial assumptions due to reasons that are not measured in the current Experience Study process. Possible explanations for these “other” losses are the effects of salary spiking, purchase of service credits, prior service in other divisions, etc. We note that we did encounter an apparent example of salary spiking in our review of a recent retiree. In addition, we note that there are some small but relevant spikes in retirement rates for certain groups at some ages. We also note that “prior service” could compound the losses associated with the salary spiking phenomenon due to the projected salary in the actuarial valuation being lower than actual salary and then further falling behind the salary spike. We also considered the possibility that members who were classified as “retired on an estimated annuity” in a year might be getting missed in the valuation process and in this gain/loss analysis. Our conclusion is that they are appropriately being included in the retired life valuation. Consequently, we do not believe that the omission of the members from the active life valuation is contributing to the “other” losses. We note that the total “other” loss is approximately \$211M and that the total accrued liability of the active life fund is \$32,932M as of December 31, 2004. Consequently, this “other” loss represents less than 0.6% of the total accrued liability of the fund. Given the relative magnitude of the “other” loss, we do not believe that the current actuarial valuation process is overlooking significant costs for the fund. However, if interested parties believe that further analysis of the “other” loss is warranted, we recommend that further study of the emerging reserve transfers would be the most logical starting point.



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May 25, 2006

Diann Allsen
Wisconsin Legislative Audit Bureau
22 E. Mifflin Street, Suite 500
Madison, WI 53703-3233

Dear Ms. Allsen;

Thank you for the opportunity to address the conclusions reached by Milliman, Inc. in their audit of actuarial services being provided to the Wisconsin Retirement System (WRS) by Gabriel, Roeder, Smith and Company (GRS). We are pleased that their overall finding is that GRS's valuations are reasonable and reflect generally accepted actuarial practices.

We agree with Milliman's conclusion that the Frozen Entry Age Actuarial Cost Method, as modified by the Experience Amortization Reserve, is appropriate for use by the WRS. While use of this actuarial cost method is not common among public pension plans, it is an effective tool in allowing the WRS to provide participating employers with the benefits of a cost-sharing plan while simultaneously offering employer choice in recognizing and financing prior service.

We also agree with Milliman's conclusion that the Market Recognition Account (MRA) is an appropriate asset valuation methodology for the WRS. The MRA, though only in use since 2000, has already proven its effectiveness in moderating the impact of historic market volatility on employer contribution rates and annuitant dividends while maintaining appropriate system funding. Our internal studies have confirmed that the MRA is far more effective as an asset smoothing technique than the Transaction Amortization Account it replaced.

We are pleased that Milliman concluded that GRS correctly implemented the provisions of 1999 Wisconsin Act 11. Act 11 was a complex modification to the funding and benefit structure of the WRS, further complicated by retroactive implementation after a prolonged legal challenge. Proper implementation was a challenge for both the Department and GRS.

We noted several instances in which Milliman identified technical aspects of the valuation in which alternative methodologies could be considered. While none of the proposed changes would materially affect the results of the valuation, we think it is healthy to consider any opportunities to improve the process. We will be working with GRS to evaluate the recommendations and decide which make sense for the WRS.

Letter to Diann Allsen
May 25, 2006
Page 2

We appreciate the efforts of the Legislative Audit Bureau in facilitating this audit. It has provided valuable assurances to trustees, legislators, members and other stakeholders that the critical actuarial role in financing WRS benefits is being performed appropriately.

Sincerely,

David A. Stella
Deputy Secretary
Phone: (608) 266-3641
Fax: (608) 267-0633

cc: John Vincent
Bob Willett
Bill Hogan, Milliman, Inc.
Tim Herman, Milliman, Inc.
Norm Jones, GRS

May 26, 2006

Mr. David Stella
Deputy Secretary
Wisconsin Department of Employee Trust Funds
P. O. Box 7931
Madison, Wisconsin 53707

Re: Actuarial Review of GRS Work for WRS

Dear Dave:

Earlier this year, you retained Milliman USA to review our December 31, 2004 valuation and related work. GRS is very supportive of the actuarial review process. We have reviewed the work of other firms, and similarly, our work has been reviewed many times. A common purpose of an actuarial review is to double check the retained actuary's technical work, and to ensure that mathematical processes are being carried out correctly and appropriately. The actuarial review process also provides a means for Boards to receive a different perspective on their particular situation from another experienced consulting firm. In virtually every actuarial review that GRS has been involved in, the end result is an improved product for the client.

Mr. Hogan and Mr. Herman, the Milliman actuaries assigned to the audit, have now completed the review and have provided their report dated May 22, 2006. The conclusions reached in their audit regarding the December 31, 2004 valuation were stated as follows:

- Has been prepared using reasonable actuarial assumptions
- Has been prepared using a reasonable actuarial funding method, properly applied
- Has been prepared by fully qualified actuaries and in accordance with all applicable Actuarial Standards of Practice
- Presents a fair and reasonable representation of the actuarial accrued liabilities of the WRS
- Determined contribution rates which, in general, are appropriate to satisfy the funding obligation of the WRS described in the actuarial report.

GRS is pleased that no major areas of disagreement between the auditing actuary and ourselves on matters pertaining to the WRS valuation have been discovered.

There follows below a brief commentary on the recommendations that the reviewers made in their report.

A. Actuarial Assumptions

1. **Disability Retirements.** On page 9, the reviewers suggest the age 50-54 group for protective service members be monitored in the next experience study to see if a change is warranted. We agree and will incorporate this in our analysis for the 2003-2005 Experience Study.
2. **Service Retirements.** On page 9, the reviewers note that other systems measure retirement experience on a “select and ultimate” basis relative to the first year of eligibility and suggest that the next experience study incorporate this analysis. We will test this effect in our analysis for the 2003-2005 Experience Study.
3. **Active life mortality.** On page 10, the reviewers recommend that an assumption of future mortality improvements (sometimes referred to as “generational mortality”) be incorporated in the Active Life Valuation. This methodology is a relatively new trend. Many actuaries are now recommending it be built into their models. Due to the complex nature of the Wisconsin Retirement System and in particular, the operation of the dividend process, we will need to analyze this in the upcoming 2003-2005 Experience Study to ensure its appropriateness for WRS.

B. Valuation Results

1. **On page 14, the reviewers note that in one of the test life cases, there appears to be no liability calculated for the death-in-service benefit that occurs before certain ages.** We have isolated the cause of this inconsistency in our programs and believe it to affect only a select class of cases. The impact is minor and will not materially affect results, but we will correct this in our December 31, 2005 valuation.
2. **On page 14, the reviewers note that they were not able to match the joint and survivor reduction factor produced by our test cases with the factors disclosed on the WRS website.** The factors do not match exactly. Our valuation programs are using an approximation technique to determine these factors. The factors will be overstated in some cases and will be understated in other cases, but on average should balance out close to the actual. We will review the methodology as part of the 2003-2005 Experience Study.
3. **On page 15, the reviewers recommended that GRS modify the plan provisions and/or actuarial assumptions to clarify the treatment of disability benefits in the valuation.** We believe that the summary of benefits section of our report accurately describes the disability benefits. Beginning with our December 31, 2005 valuation, we will revise our actuarial assumption section to clarify how the disability benefits are being valued.

4. **On page 15, the reviewers note that there is an adjustment to the retirement benefit present value calculation for certain cases in which the disability benefit is larger than the normal retirement benefit, and suggest the assumption be disclosed in the valuation report.** This assumption will be noted in the December 31, 2005 valuation report.
5. **On page 15, the reviewers suggest that either future experience studies be modified so that the withdrawal rates include all separation from active service for the first five years (including death and disability) or that the valuation procedures be modified so that death and disability decrements apply in the first 5 years of a member's service.** We will perform this analysis in our 2003-2005 Experience Study.
6. **On page 15, the reviewers suggest that we change from using decrement rates to probabilities.** This has been discussed in the past with DETF staff. Prior analysis indicated that this would not create a material difference in our results. We will perform this analysis again in our 2003-2005 Experience Study.
7. **On page 16, the reviewers note that for members with prior service in multiple service groups, the assumed retirement age and final average salary that are calculated for each of the divisions are sometimes inconsistent.** We will review this methodology in our 2003-2005 Experience Study to determine if our methods should be changed.
8. **On page 17, the reviewers noted some 'salary spiking' for a test life case who recently retired, and suggested this phenomenon may warrant more detailed review in the next experience study or in a separate project.** We have seen this situation occur in other plans as well and believe it would need to be studied for a more representative sample size. While it is beyond the scope of the regular experience study, we would be happy to perform a separate study if WRS were to approve one.

C. Valuation Report

1. **On page 19, the reviewers noted that Employer Reserves on Page I-17 and I-18 of the December 31, 2004 valuation report do not agree and that the differences be footnoted.** We receive the Employer Reserves directly from WRS. There are sometimes minor differences between schedules. The 2005 figures do agree. We will inquire about these differences in the future to see if a footnote is warranted.
2. **On page 19, the reviewers suggest that additional detail be provided in the summary of plan provisions regarding the normal form of benefit, interest crediting (between fixed and variable funds), and disability benefits for protective employees.** This is a good suggestion. We will review the summary of provisions in our December 31, 2005 actuarial valuation and provide additional information on these items.

D. Gain/Loss Report

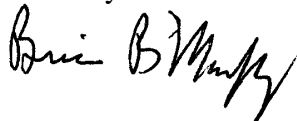
1. **On page 23, the reviewers suggest that page 9 and page 10 of our December 31, 2004 Gain/Loss report be combined to show the entire gain/loss analysis on one page.** This may be difficult to do and still maintain readability of the numbers. We will review this at the time of our gain/loss report to determine if this is feasible or if there is a more suitable way of summarizing our results.
2. **On page 24, the reviewers recommend the further study of the emerging reserve transfers be performed to gain additional insight into the source of the "other" loss category.** We agree and have suggested this also in the past. We would be happy to perform this analysis if WRS were to approve such a study.

E. Experience Study report

1. **On page 9, the reviewers suggest that GRS consider providing A/E ratios (Actual versus Expected) in future experience studies.** We note that this is primarily a style difference in reports. If it would be helpful to WRS, we would be happy to add this information in the next experience study.
2. **On page 10, the reviewers note that on page 100 of our 2000-2002 Experience Study, the disability mortality rates exceed 100% for ages between 101 and 108 and believe this to be a typographical error.** This is a typographical error and will correct this in our next experience study report.

At this time, we would like to thank Mr. Hogan and Mr. Herman for the work they have done, the suggestions that they have provided, and for their very professional demeanor and handling of this review.

Sincerely



Brian B. Murphy, F.S.A.



Norman Jones, F.S.A.



Mark Buis F.S.A

BBM/NJ/MB:dm

cc: William Hogan
Timothy Herman
Robert Willet