

ACTUARIAL AUDIT REPORT

STATE OF OKLAHOMA
PUBLIC EMPLOYEES RETIREMENT SYSTEM

MELLON
HUMAN RESOURCES AND INVESTOR SOLUTIONS

FEBRUARY 19, 2004

CONTENTS

I.	Executive Summary	1
II.	Technical Review of Actuarial Computations	2
III.	Review of Valuation Report	6
IV.	Review of Actuarial Assumptions and Methods	9

I. EXECUTIVE SUMMARY

PURPOSE AND SCOPE OF THE ACTUARIAL AUDIT

Mellon was engaged by the Oklahoma Public Employees Retirement System (OPERS) to conduct an actuarial audit of the July 1, 2003 actuarial valuation of the State of Oklahoma Public Employees Retirement System (the System). The actuarial valuation was prepared by Mercer Human Resource Consulting, Inc. (Mercer), current actuary to OPERS.

The purpose of this audit was to provide assurance to the Board that all work is being carried out correctly. The scope of the audit included both a technical review to determine the accuracy of the actuarial results, and a professional peer review of the experience study and the actuarial assumptions and methods used by Mercer, and of the information provided in the actuarial valuation report. The technical review covered a verification of the valuation work performed on account of the active and retired members of the System, while the peer review covered the major actuarial assumptions and methods as well as the full valuation report.

PRINCIPAL FINDINGS

We are pleased to report that we found liabilities and costs reported by the actuary are reasonably close to the liabilities calculated by Mellon. For the most part, we found the work to be reasonable and performed in accordance with generally accepted actuarial principles and practices. The audit exceptions, while important, did not materially impact the basic actuarial findings. Our report does include some suggestions with regard to the actuarial assumptions and methods, which we hope will be considered.

AUDIT EXCEPTIONS

We found one minor item of exception.

Liability for elected officials appears to have been valued as a 100% survivor benefit: Elected officials are permitted to collect their pension benefits with a guarantee of half (50%) continuing to a surviving spouse if the member predeceases the spouse. When we calculated liabilities on this basis, we found that our liabilities for the elected officials group were approximately 4% lower than those calculated by Mercer. Most our other liabilities were within about 1%. If we were to recalculate those liabilities based on 100% continuing to a surviving spouse, we were again within 1%. We suspect that this is because Mercer is calculating those benefits as if they were a 100% survivor benefit instead of a 50% survivor benefit.

We wish to reiterate that other than this, our calculated liabilities were a close match to those calculated by Mercer.

II. TECHNICAL REVIEW OF ACTUARIAL COMPUTATIONS

PRINCIPAL FINDINGS

Based on the actuarial assumptions and methods adopted by the Board, it is our opinion that the liabilities for the groups reviewed are reasonably accurately presented in the July 1, 2003 actuarial valuation report prepared by Mercer. We matched total liabilities within 1% and total required contribution within 3.6%.

COMMENTS

The technical review covered the following items:

- Verification that the benefits and liabilities (present value of future benefits and normal cost) are being calculated correctly, and that all significant benefits are being accounted for.
- Verification that the employer contribution rate is being calculated correctly.
- Review of experience study methodologies and findings.

For the technical review, Mercer provided us with valuation-ready data for active and retired members of the System. We programmed their benefits into our valuation system and performed side-by-side comparisons of our valuation results with the results obtained by Mercer for selected individual members, and for each group in the aggregate. In addition, we compared our results to Mercer for the elected officials, nonelected members and Department of Corrections. In order to ensure the accuracy of our conclusions, we had discussions with both OPERS staff and Mercer about methodology, System benefits, and about our preliminary findings.

VARIATIONS IN RESULTS

It is normal for two different actuarial firms to calculate slightly different liabilities or contribution rates for a given retirement system. Actuarial valuations are performed to estimate the cost of future events, and the computer models used by different firms will differ in subtle ways. Many times, there may be more than one acceptable approach or procedure. For example, the Mellon model assumes that events (retirement, death, etc.) occur in the middle of each fiscal year, while the Mercer model assumes that these events occur at the beginning of the fiscal year. Both approaches are common in the actuarial community, and the two different approaches lead to minor differences in valuation results. Overall, we believe that the liabilities calculated by the two firms should differ by no more than 1% or 2%.

Actuarial Assumptions

We found that Mercer is correctly applying the various actuarial decrements: rates of retirement, death, disability, and withdrawal from service. The actuarial interest rate was used correctly.

Benefit Liabilities

As shown on the following table, we found that the benefits are being correctly valued.

II. TECHNICAL REVIEW OF ACTUARIAL COMPUTATIONS

The following table illustrates our comparisons for the valuation report of July 1, 2003:

	Mercer	Mellon	Deviation
1. Active Member Salaries	\$ 1,411,719,256	\$ 1,411,276,936	-0.03%
2. Normal Cost at Mid-year	158,466,716	161,968,321	+2.21%
3. Present Value of Benefits			
Active Members	\$ 4,711,312,044	\$ 4,771,686,755	+1.28%
Retirees	2,694,938,714	2,736,949,854	+1.56%
Beneficiaries	149,505,798	155,828,671	+4.23%
Members with Deferred Benefits	266,177,976	265,974,672	-0.08%
Disabled Members	102,012,505	104,312,406	+2.25%
Unclaimed Contributions	13,678,079	13,678,079	0.00%
Medical Insurance Premiums	174,529,327	172,057,353	-1.42%
COLA Reserve	<u>57,673,705</u>	<u>59,109,919</u>	<u>+2.49%</u>
Total	\$ 8,169,828,148	\$ 8,279,597,709	+1.34%
4. Actuarial Accrued Liability	\$ 6,974,583,356	\$ 7,060,994,108	+1.24%
5. Total Required Contribution	\$ 307,527,736	\$ 318,622,592	+3.61%

A further breakdown of the active member present value of projected benefits is as follows

	Mercer	Mellon	Deviation
Present Value of Benefits for Active Members			
Retirement	\$ 4,085,822,025	\$ 4,134,300,629	+1.19%
Withdrawal	338,354,866	342,713,468	+1.29%
Death	110,873,156	120,725,598	+8.89%
Disability	152,358,018	150,043,081	-1.52%
Members who have not yet applied	<u>23,903,979</u>	<u>23,903,979</u>	0.00%
Total	\$ 4,711,312,044	\$ 4,771,686,755	+1.28%

We compared the results in total to Mercer's, as well as the results broken down by three subgroups. We matched closely on the nonelected members and the Department of Corrections members. However, on the elected officials, Mercer was 4% higher on present value of benefits than our results. Married elected officials get a benefit that is in the form of 50% joint and survivor benefit without actuarial equivalent reduction. Mercer's numbers appear to be valuing this as a 100% joint and survivor benefit.

II. TECHNICAL REVIEW OF ACTUARIAL COMPUTATIONS

Calculation of Required Contribution Requirement

The required contribution requirement is the sum of:

1. Normal Cost, mid-year,
2. Amortization of the Unfunded Liability over 40 years from July 1, 1987, mid-year, and
3. Budgeted expenses

This is a reasonable calculation and amortization period and Mercer correctly implemented the methodology.

Postretirement Medical Insurance Premium

Mercer correctly valued the \$105 medical premium. The Retirement Medical Benefit Fund is a sub-account that is composed of assets used to pay the retiree health insurance premium benefit, and is administered as an IRS Section 401(h) account.

Data Issues

We noted some discrepancies in the data used in the actuarial valuation.

- Members without applications:

The most significant relates to members who had not completed an application, which includes 916 members in the July 1, 2003 valuation.

Mercer uses an averaging method to estimate the liabilities related to these "no applicant" participants. Mercer reports that:

Included in the valuation are "members without applications." These members are contributing to the System but have not yet filled out an enrollment application. For these members, amounts are added to the active liability and normal cost based on the average liability and normal cost for a new member. They are also assigned the average compensation for new members. Additional compensation equal to the average for new members is added to the total earnings so that these members would be reflected in the normal cost contributions.

This procedure counts up the 916 members with no application and assumes that they have characteristics identical to the average of other new members. The liability associated with a new entrant is recalculated each year based on the new entrants in that year's valuation and, therefore, varies on a year-to-year basis. The new entrant group each year may have rehires included in it, so the average could be skewed.

II. TECHNICAL REVIEW OF ACTUARIAL COMPUTATIONS

A better procedure, if an estimate is required, would be to determine the average age, sex and salary of new Members based on several years of experience, and then develop a valuation assumption.

- Unclaimed contributions:

The amount of unclaimed contributions for nonvested, inactive participants who have quit or terminated is added into the liability. We agree with this methodology.

- Assumed deferred vested participants:

Each year participants terminate who appear to be vested but do not appear on OPERS data. Mercer estimates the benefit for these participants and values them as assumed deferred vested participants. This is a reasonable approach. There may be some overlapping of these participants with the unclaimed contribution group.

- Other data concerns:

The data included two more retirees than in the Mercer report but the total retirement benefits payable matched. Approximately 5 records had dates of hire that were incorrect, implying hire ages of younger than 15 years old. Two actives had dates of birth that were blank or incorrect.

Another minor discrepancy is that the report indicated that benefit distributions are based on attained age. We found that they were based on nearest age. "Attained age" is the age that an individual was on their last birthday. It is the answer to the question: "How old are you". "Nearest age" is another way actuaries use age. It's the age an individual is on the closest birthday. For example, someone who will have a birthday in the next six months will use their age on that birthday as their "nearest age".

III. REVIEW OF VALUATION REPORT

PRINCIPAL FINDINGS

The report generally meets professional standards and fairly represents the actuarial condition of the System.

COMMENTS

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. In general, the information contained in the report should be such that:

- the report would be properly interpreted and applied by the persons to whom it is directed; and
- another actuary in pension practice could form an opinion about the reasonableness of conclusions drawn in the report.

ASB No. 4 also specifies that an actuarial report should include the following items:

- 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
- A statement of findings, conclusions or recommendation necessary to satisfy the purpose of the report

With one minor exception, the July 1, 2003 actuarial valuation report prepared by Mercer meets all of these requirements.

The main issue that we found is relating to the valuation of benefits for retired members who elect Option A or Option B forms of payment. The valuation report describes the following procedure used:

“The retirement benefit liability for retired members that elected payment Option A or payment Option B is increased by 2.0% to account for the liability for the pop-up provision of the payment option.”

III. REVIEW OF VALUATION REPORT

There is no support provided for this estimation amount either in the valuation report or in the Experience Study. The optional forms of payment were modified on July 1, 1994 to incorporate the pop-up feature on an actuarial equivalent basis. All retirees from that date forward should have data on the unreduced benefit as well as on the actuarial equivalent reduced benefit. We recommend that the actual benefits, before and after pop-up, be valued, rather than a 2% load.

Another issue involves a table indicating average annual rates of investment return. In particular, it shows a cumulative ten-year average rate of return of 10.4% on an actuarial value basis, and 7.8% on a market value basis. These numbers are particularly sensitive to the time period selected. In this instance, both the beginning and ending period create a particularly misleading statistic. In the long run, the average actuarial return and market return will be essentially the same. To have a 2.6% difference for a ten year period seems inappropriate, and can easily be misunderstood. We recommend that this column of average actuarial return not be calculated and reported.

GASB Statement 25 requires a presentation of "actuarial determined information, from a long-term perspective, about the funded status of the plan and the progress being made in accumulating sufficient assets to pay benefits when due." The information, covering a minimum of six years, is to be provided in two schedules of historical trend information – a Schedule of Funding Progress and a Schedule of Employer Contributions. In addition, the Statement 25 disclosure should present the following additional information as of the latest actuarial valuation:

- Valuation date
- Actuarial cost method
- Amortization method
- Remaining amortization period
- Asset valuation method
- Actuarial assumptions:
 - Investment rate of return*
 - Projected salary increases*

*Includes inflation at cost-of-living adjustments

GASB Statement 25 became effective for the fiscal year ending June 30, 1997. The Statement has a provision which allows plans to exclude information from the required schedules for years prior to implementation if calculations were not made in accordance with the parameters of the Statement. However, Q&A 111 of the Guide to Implementation of GASB Statements 25, 26, and 27 on Pension Reporting and Disclosure by State and Local Government Plans and Employers, published by GASB, specifically provides that plans may not delay implementation beyond the effective date of the Statement.

III. REVIEW OF VALUATION REPORT

The Statement 25 disclosure in the July 1, 2003 actuarial valuation report currently includes such information.

The Government Finance Officers' Association (GFOA) has published Guidelines for the Preparation of a Public Employee Retirement System Comprehensive Annual Financial Report. While these are requirements for a CAFR, and not specifically for the actuarial report itself, we think it makes good sense for the actuarial report to provide the information needed for the Actuarial Assumptions and Methods Section of the CAFR. Based on a review of the GFOA guidelines, we recommend that Mercer add the following information to the Actuarial Basis section of the actuarial report.

- The date(s) of adoption of the actuarial cost method, the asset valuation method, and each of the actuarial assumptions.
- The date of the most recent experience study and an indication of which of the current assumptions are based on the results of that study. If any of the actuarial assumptions are not based on an experience study, indicate upon what basis the assumptions were determined.

IV. REVIEW OF ACTUARIAL ASSUMPTIONS AND METHODS

The current actuarial assumptions were adopted for the July 1, 2002 actuarial valuation based upon the results of the May 16, 2002 Experience Analysis study. The standards of the actuarial profession require that actuarial assumptions should be reasonable both individually and on an aggregate basis. However, it should be recognized that in the setting of actuarial assumptions, there is not one answer that reflects the best estimate of future experience. There is a best-estimate range within which reasonable assumptions lie, and two different actuarial firms may easily choose different assumptions which lie within this best-estimate range.

- Economic Assumptions

Inflation: 3.0% per annum is the inflation rate. We believe that this is an appropriate rate, in light of both past history and the market estimates of inflation. Inflation indexed bonds are currently yielding 2.10% plus inflation. Long Term Treasury Bonds currently yield 4.92%. This implies an anticipated inflation rate of approximately 2.76%, below the actuarially assumed rate of 3.0%. If inflation and inflation expectations continue to be low for the next five years, Mercer may wish to consider a further reduction in the anticipated inflation rate.

COLA: Mercer indicated that the cost-of-living-allowance is projected based on an increase in base salary equal to two-thirds of inflation. We believe that this is reasonable, but more accurate analysis might be appropriate.

Salary Increase: Rates of salary increase are age-related, ranging from 9.0% at age 20 to 5.1% at age 65 and older. The salary rates were increased by 1% at all ages as a result of the last Experience Study based on three years of historical data. In the July 1, 2003 valuation, experience related to salaries showed a liability gain of approximately \$146.8 million, or 2.1% of expected liability. Salaries did not increase as much as expected from the assumptions, so the liabilities did not increase as much as expected, resulting in this actuarial gain. This assumption should be monitored each year and adjusted downward, if large gains are observed each year.

Interest Rate: The current assumed rate is 7.5% per annum. We concur with Mercer's recommendation to maintain a 7.5% interest rate assumption, although a more robust discussion of the asset allocation issue would have been useful, particularly in contrast to the Judges plan, which also uses the 7.5% assumption.

As an additional point of reference, the 2003 Wilshire Report on State Retirement Systems: Funding Levels and Asset Allocation indicated that the average public pension fund was utilizing an 8.05% return assumption and had 59% of assets in equities. This System uses a 7.5% assumption and has 58% target assets allocated to equities.

- Demographic Assumptions

Mortality: Mercer recommended considering the 1994 GAM table with projection at the next experience study. We do not understand the logic of waiting, but do not have a major concern as long as the mortality table is corrected in the near future.

IV. REVIEW OF ACTUARIAL ASSUMPTIONS AND METHODS

Withdrawal: Mercer utilizes five-year select and ultimate withdrawal rates. The rates are based upon age and service. The Experience Study recommended increasing the withdrawal rates for members with three or more years of service. The gain/loss shown in the July 1, 2003 valuation for withdrawal rates is within .7% of expected, which would indicate relatively close match for one year. The select and ultimate withdrawal rates appear to be reasonable.

Retirement: Retirement rates are dependent upon the normal and early retirement eligibilities. OPERS has three separate member groups (elected, nonelected, and hazardous duty) with different normal and early retirement provisions.

- **Nonelected.** Unreduced retirement benefit at age 62, or Rule of 80/90 (plus 6 years of service if hired after January 1, 1983)
- **Elected.** Unreduced retirement benefit at age 60, or Rule of 80 (plus 6 years of service if hired after July 1, 1990)
- **Hazardous duty.** Unreduced retirement benefit at 20 years of service, or age 62, or Rule of 80/90 (plus 6 years of service if hired after January 1, 1983)

The only group studied in the Experience Analysis for retirement rates is the nonelected group. The elected members are valued under the same retirement rate assumptions as the nonelected group. Due to the earlier age 60 retirement age for elected officials, we would recommend separate retirement rates for them.

In the valuation, the hazardous duty members have their own retirement rates based on service and age, which we find appropriate. However, we did not find any support for the development of those rates. We recommend that the hazardous duty members be included in the next Experience Analysis.

Line of duty deaths for Hazardous duty members: Mercer does not include any assumption regarding the incidence of line of duty deaths. The benefit provided to officers killed in the line of duty is based on a 2.5% formula and on the greater of actual service or 20 years. This is an enhanced benefit, so we recommend that it be valued by adding an assumption for line of duty deaths.

Employee contributions vary by employee groups: The three employee groups covered by this system have different formulas, retirement ages, and contribution schedules. We have reviewed the total liabilities and total contribution requirements in this audit. We have not evaluated the appropriateness of the employee contribution portion of the total required contribution.

IV. REVIEW OF ACTUARIAL ASSUMPTIONS AND METHODS

Actuarial Cost Method

Mercer is using the entry age normal actuarial cost method. This is the most common method used by public systems. As shown below:

Actuarial Cost Method	Survey 1 ⁽¹⁾	Survey 2 ⁽²⁾
Entry Age	60%	75%
Aggregate	11%	11%
Frozen Initial Liability	6%	0%
Projected Unit Credit	11%	14%
Other/Miscellaneous	12%	0%
Total	100%	100%

⁽¹⁾ 2001 Survey of State and Local Government Employee Retirement Systems (152 systems)

⁽²⁾ 2003 Wilshire Report on State Retirement Systems: Funding Levels and Asset Allocation (116 systems)

It produces stable costs and is somewhat conservative. We believe that the method is appropriate for the System.

Asset Valuation Method

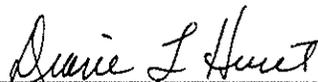
Mercer uses a five-year write-up method to calculate the actuarial value of assets. This is a common method that produces reasonable, smooth results. In periods of continued strong asset performance, such a method tends to create actuarial values that lag market value. With the recent reduced investment returns, this is no longer much of a concern.

The Arizona State Employees Retirement System has extended their averaging period to ten years. We are not aware of any other system making a similar change.

Respectfully submitted:



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