

**OREGON PUBLIC EMPLOYEES RETIREMENT SYSTEM**  
ACTUARIAL REVIEW OF PENSION AND POSTEMPLOYMENT  
HEALTHCARE PLANS  
NOVEMBER 9, 2010

November 9, 2010

Mr. Dale Orr  
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P.O. Box 23700  
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**Subject: Actuarial Review of December 31, 2009 valuation for the Oregon Public Employees Retirement System (OPERS).**

Dear Dale:

We have performed an actuarial review of the December 31, 2009 Actuarial Valuations for OPERS.

This report includes a review of:

- the assumptions used by the retained actuary;
- the retained actuary's data collection process;
- the System's current actuarial funding methods and funding policies;
- the benefits modeled in the valuation as they compare to the benefits actually provided as stated in Statute and described in the member handbooks;
- the reasonableness of results of the December 31, 2009 actuarial valuation and December 31, 2008 experience study;
- the successfulness and completeness of the presentation of the valuation results (as contained in the valuation reports); and
- a comparison of OPERS benefits with those provided in similar statewide system, a process known as benchmarking.

A major part of the review is a thorough analysis of the test lives provided by Mercer. The report includes exhibits which summarize the detailed analysis of these sample test cases, as well as a comparison of the results between Mercer and GRS.

We wish to thank the staff of the Actuarial Analysis Section of the Oregon Public Employees Retirement System and Mercer without whose willing cooperation this review could not have been completed.

Sincerely,

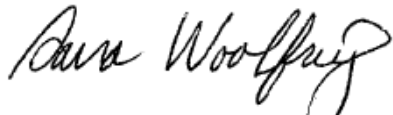
Gabriel, Roeder, Smith & Company



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## SECTION 1

### EXECUTIVE SUMMARY

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## EXECUTIVE SUMMARY

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Gabriel, Roeder, Smith & Co. was engaged by the Board of the Oregon Public Employees Retirement System to review the December 31, 2009 Actuarial Valuation of the Oregon Public Employees Retirement System (OPERS).

This report presents our findings in the following areas:

- Pension Assumptions
- Health Care Cost Assumptions
- Actuarial Valuation Methods and Procedures
- Contribution Rate Determination
- Actuarial Valuation Report
- Summary and Conclusions

In general, we found that Mercer's actuarial results and report were reasonable. We found no major areas of concern in the actuarial valuation results, and find the assumptions consistent with generally accepted actuarial practice. The following items are items which may require consideration or action prior to completion of the December 31, 2010 actuarial valuation:

- After reviewing the capital market analysis completed by both Mercer and GRS (in the pension assumption review section), we recommend the Board continue its biennial assessment of the investment return assumption. Currently an assumption of 8.00 percent is used; and the 8.00 percent is now deemed at the high end of a reasonable assumption.
- We recommend the Board consider a modification to the total lump sum election at retirement and the refund election at vested termination. The current method for applying the rates does not look at individual circumstances such as the relative value of the account balance against the annuity. As an extreme case, a member with a \$0 account balance could be assumed to elect a lump sum distribution. The rates being used are generally appropriate, but should be used in conjunction with an exception for cases where the participant would be making an irrational economic decision in order to obtain a lump sum benefit.
- We recommend the Board consider moving to middle of year decrement timing. Currently, the actuarial valuation for OPERS uses beginning of year decrement timing. This is an assumption that all events such as retirement, death and disability occur at the beginning of the year.

More information regarding these three items is contained in the pension assumption review section.

- In addition, when completing the next experience study, we recommend that demographic assumptions be based on the System's experience during the experience period, historical plan experience, and expected future trends. Assumptions determined in the prior experience study relied heavily on experience during the experience period and we observed very little consideration of historical plan experience. We recommend a broader review of past and future considerations so that the temporary conditions do not unduly influence the long-term assumptions.

#### SUMMARY OF TEST LIFE REVIEW

We have included as a part of this report a detailed summary of test life results.

- We matched the present value of benefits closely in total on all test lives submitted. We have included exhibits in Section 4 of the report which summarize the differences in calculations by decrement for the test lives analyzed. Differences between actuarial firms will always occur due to system differences and other nuances in the calculations.
- The actuarial basis used for the funding of the plan lies within the range of reasonableness.

#### SUMMARY OF FINDINGS

<b>Key Findings</b>
<ul style="list-style-type: none"> <li>• Continue biennial assessment of investment return assumption</li> <li>• Modify lump sum and return of contribution assumptions so that value of contribution balance is reflected in the member's election decision</li> <li>• Change decrement timing to middle of year</li> <li>• Enhance the experience study report to include more data (exposures and counts)</li> <li>• Study the impact of vacation pay on retirement benefits in the next experience study</li> <li>• When setting assumptions, give some weight to the historical experience (experience prior to the current experience study) and future expectations</li> <li>• Estimate rate impacts for restoring the Rate Guarantee Reserve</li> <li>• Include current premium amounts used to determine the RHIPA liability in the report</li> </ul>

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## SECTION 2

### REVIEW OF PENSION ASSUMPTIONS AND BENEFITS

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## REVIEW OF PENSION ASSUMPTIONS

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### DEMOGRAPHIC ASSUMPTIONS

#### General Comments

Proposed assumptions should be determined giving consideration to the System's experience over the four-year experience period, historical plan experience, and expected future trends. In general, the assumptions proposed by Mercer seem to rely too heavily on experience during the experience period with little consideration for prior rates, or historical plan experience. While OPERS is a major statewide system with a large amount of exposure during a four-year period, it is still subject to temporary conditions that should not be allowed to unduly influence the choice of long-term assumptions. In addition, while OPERS is a major statewide system with a large amount of exposure, there may be benefit groups (OPSRP) and decrements where there is not a lot of exposure. Mercer did not include the exposure counts in their report and so we were unable to evaluate where there might be areas where Mercer relied on a small amount of experience to set the rate. In addition, actual to expected ratios were not shown for the prior and the proposed assumption except in the case of the mortality assumption. We recommend the experience study illustrate more data so the Board can temper their decisions with knowledge of the credibility of the given data set.

#### Mortality

##### *Healthy Annuitant Mortality*

Mercer has elected to use generational mortality tables. Generational mortality tables take into account mortality improvements assumed to be observed in the future. Based on a generational mortality table, someone born in 1940 will have a slightly longer life expectancy than someone born in 1930. This trend is assumed to hold for all years of birth. The projection will take into account these future improvements, and the actual experience data can be fit to the available tables without including a margin or cushion for future improvements. Mercer has separated experience data into sex-distinct separate employee groups for school districts, police and fire, and other general service. Actual female police and fire experience was grouped in with other general service. Tables and age setbacks were selected so that actual to expected ratios were within the range of 99 to 101 percent. Both the group structuring and methodology of rate-setting appear reasonable.

##### *Non-Annuitant Mortality*

Mercer has structured the pre-retirement mortality rates as a specified percentage of healthy annuitant mortality. This is a commonly used approach. Mercer has adjusted the specified percentages so that the actual to expected ratio is within 90 to 110 percent. This approach appears reasonable.

*Disabled Mortality*

Due to the fact that mortality rates for disabled members are not anticipated to improve in the same manner as they are for healthy annuitants, Mercer proposed keeping the same static disabled mortality table with adjustments to the age setback and minimum rates so that the resulting actual to expected ratios were 101 and 102 percent. We concur with this recommendation.

**Retirement***Tier 1/Tier 2*

Retirement rates were developed at each age for three different employee groups (police and fire, general service, and school districts) and fall into three different potential service categories. Based on benefit eligibility and general expectations regarding retirement (higher rates of retirement expected at higher age and service combinations, etc.), the structure of rates appears reasonable.

Rates were based on actual observed experience during the study period. Nearly full credibility was given to the study period data. In other words, the proposed rates are set closely to the observed rate, rather than using a blend of the observed rate and the prior rate to reflect partial consideration of the System's historical experience outside of the study period. In select instances, the rate was set outside of the interval between the prior rate and the observed rate. In general, the rate setting appears reasonable, but we would have given partial credibility or consideration of historical rates.

Judge members are assumed to retire at age 63. While this assumption is not inappropriate for a group that represents a small portion of the overall population, it could cause the post-retirement health benefits to be undervalued for this group if members retire earlier than assumed. We recommend study of the actual distribution of retirement ages.

*OPSRP*

The rate structure is similar to Tier 1 and Tier 2 rates, with some minor modification because General Service and School District employees do not have a 30 and out provision under OPSRP. OPSRP has not had enough retirement experience to produce the retirement exhibits shown and because the confidence intervals look similar in magnitude to those shown on the Tier 1 and 2 exhibits, we assume the data used was from Tier 1 and 2 retirements. This is justifiable given the limited OPSRP retirement experience, but ideally the use of Tier 1 and 2 data for the OPSRP rate setting would have been specifically stated in the report.

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### **Lump Sum Option at Retirement**

In addition to setting retirement rates, there is an assumption regarding whether a member will elect an annuity or will elect to take a lump sum of twice member contributions at retirement (money match benefit). The member can also elect to take a partial annuity and partial lump sum. Six percent of retiring members were assumed to take a partial lump sum. This assumption matches the actual retirement experience. The effect of the partial lump sum assumption is mostly observed in the benefit payment projections (rather than liabilities) because the option is actuarially equivalent to the full formula benefit.

The assumption for the total lump sum election was 6.0 percent in 2009 graded down 0.5 percent per year until the assumption expires. The assumption is used without consideration of the actual value of the potential benefits at time of decrement. An assumption of this nature can be useful for accurately reflecting projected benefit payments (acceleration of payment due to lump sum election) and reflecting a small amount of participants electing lower actuarial value benefits in order to obtain payment up front in lump sum format. However, the way the assumption is being used in the valuation program leads to undervaluing of retirement decrement liabilities. Except for judge participants, members stopped making contributions to the defined benefit plan effective January 1, 2004. As such, the value of the contribution balance is diminishing in comparison with the annuity benefit as they continue to accrue service, but no longer make contributions. The grading down of the full lump sum assumption was designed to take this into account, but does not take into account that the remaining percentage of participants who do elect the total lump sum option will be those that do not suffer a large financial loss from doing so. The lump sum assumption would better be used in conjunction with a caveat regarding the relative value of the contribution balance (for example, a member will not take the total lump sum option if the present value of the annuity benefit is at least 20 percent greater than the lump sum benefit).

### **Termination**

Termination rates are structured as select and ultimate rates with a three-year select period. Rates were determined separately for School District employees, Police and Fire, sex-distinct Independent Employers, and sex-distinct SLGRP Employers. The rate structure appears reasonable and consistent with experience.

The analysis used to determine the rates during the select period was not included so we cannot comment on the reasonableness of the proposed rates. For the ultimate rates, for Independent Employers and Police and Fire, actual experience followed the prior rates fairly closely, and no change was recommended. This does not appear to be unreasonable. For the ultimate rates, for School Districts and SLGRP Employers, the rates set seem to rely too heavily on experience during the study period.

**Probability of Withdrawal of Contributions**

In combination with the termination decrement, Mercer has included an assumption for probability of withdrawal before retirement, sometimes called “forfeiture”. This assumption reflects the probability that a member with a vested benefit will choose to withdraw contributions prior to retirement eligibility and thus forfeit the employer-provided portion of the benefit. The proposed assumption is slightly lower than actual observed experience and the prior rate. This is to reflect the diminishing relative value of the contribution balance compared to the present value of the deferred benefit. However, the assumption does not reflect the individual account balances and allows members with \$0.00 account balances to choose a “refund” of contributions rather than a deferred vested benefit. In the most extreme example, Mercer is assuming 30% of Tier 2 police and fire members hired after June 30, 2003 (who have \$0.00 contribution balances) and terminating between the ages of 25 and 39 will elect to forfeit their deferred retirement benefit in exchange for their \$0.00 contribution balance (i.e. they are trading their deferred benefit in for nothing). Members who do not have an account balance with the defined benefit plan will still have account balances with the Individual Account Program (IAP), and it is possible that a member would chose to forfeit their deferred benefit to gain access to their IAP balance. However, for conservatism and to avoid possible undervaluing of termination decrement liabilities, we recommend this assumption be modified so that the value of the defined benefit plan contribution balance be reflected in the member’s election decision.

**Disability**

Separate rates were developed for duty and ordinary disability. For ordinary disability, one set of rates was developed while for duty disability, separate rates were developed for Police and Fire. This rate structure appears reasonable. Mercer cited limited experience as their reason for changing from a table based on OPERS experience to a standard rate table. Despite citing limited experience, Mercer appears to have given nearly full credibility to the data in the experience study period when setting the rates.

**Decrement Timing**

In an actuarial valuation, a member’s age and service is measured at one point during each projection year. Eligibility and projected benefits are based on the age and service calculated at that point. Generally, systems that do not have a distinct annual cycle will use middle of year decrement timing for all decrements. This reflects that decrements will be spread evenly over the year and on average will leave at the middle of the valuation year. Cases where you might see an exception to this would be school employees or some type of seasonal employer. In this case, however, with a valuation date of December 31, we would still expect to see decrement timing of middle of year for school employees (implying summer retirements).

Although not disclosed in their report, we were able to deduce from the test lives that Mercer is using beginning of year decrement timing. We recommend this assumption be changed to middle of year to reflect the fact that decrements occur throughout the year. Based on the current retiree data, non-School District retirees have retirement dates spread throughout the year with slightly more retirements in January and July. School district retirees have roughly 40 percent of retirements occurring in July.

### **Service Purchase**

The valuation reflects instances where members are able to purchase service credit for a six-month waiting period at less than the full actuarial cost. The assumption is that 55 percent of non-money match retirements will purchase one-half year of service. No adjustment was made for money match retirements because the member makes both the employee and employer contribution. Both assumptions appear reasonable.

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## ECONOMIC ASSUMPTIONS

### General

These assumptions simulate the impact of economic forces on the amounts and values of future benefits. Key economic assumptions are the assumed rate of investment return and assumed rates of future salary increase. Economic assumptions are frequently set using the building block approach where all economic assumptions are based on an underlying inflation component.

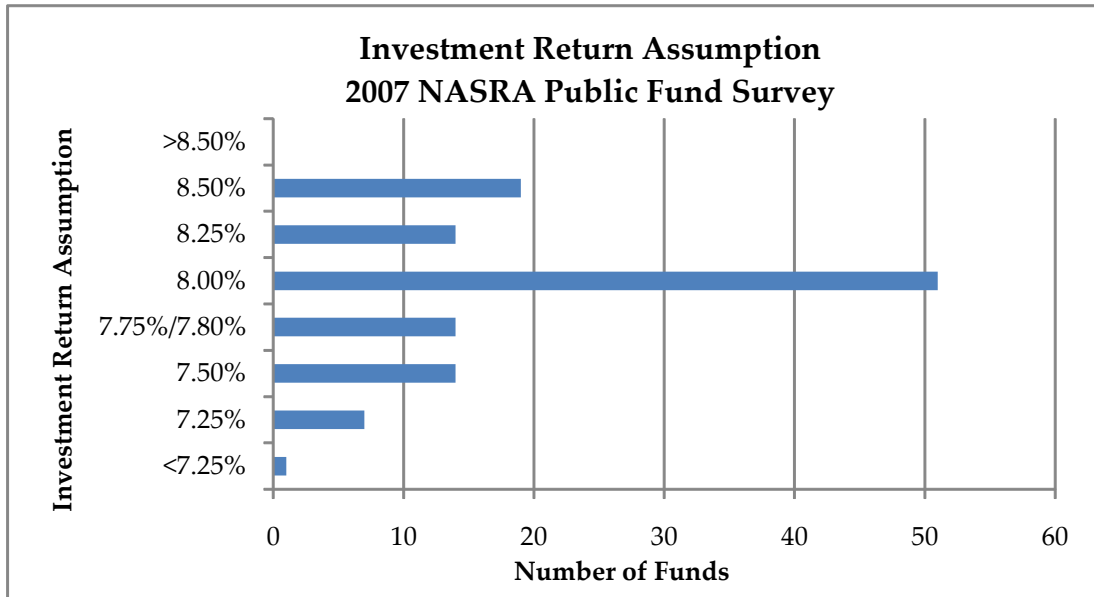
### Price Inflation

Inflation is the main building block for all other economic assumptions. In addition, the inflation assumption is used directly in determining future cost of living adjustments. Mercer recommended an inflation assumption of 2.75 percent. Mercer included historical data in the analysis which indicated a higher inflation assumption could be supported. Rather than rely on historical data, Mercer took the forward-looking approach, citing the Social Security intermediate inflation assumption available at the time, 2.8 percent, as support. This is at the lower end of the generally accepted range, and is supportable assuming all economic assumptions integrate with this 2.75 percent assumption.

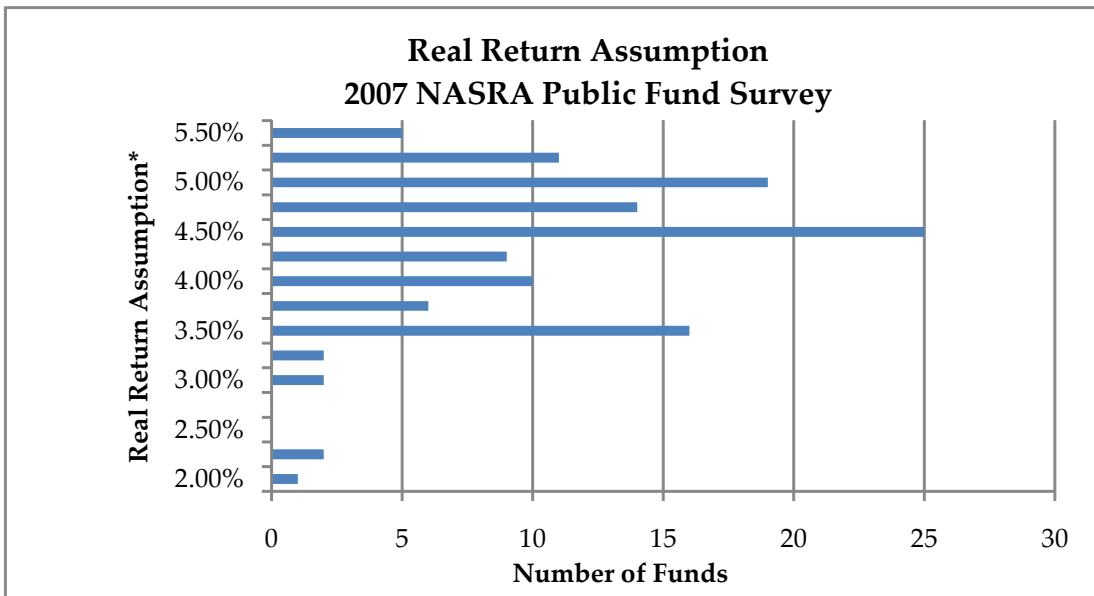
### Investment Return Assumption – Regular Accounts

The investment return assumption, or nominal return assumption, is comprised of two components, inflation and real rate of return. The investment assumption should be consistent with the previously set inflation assumption of 2.75 percent and the expected real rate of return on assets. The Board selected an 8.0 percent nominal return which implies an expected real return on assets of 5.25 percent. The 5.25 percent expected real return lies on the aggressive end of the range of reasonable assumptions.

For perspective, Mercer included an excerpt from a 2007 NASRA survey of 125 public sector systems showing the distribution of investment return assumptions. Although the 8% appears to be the norm, for OPERS the real rate of return is 5.25% and, when looking at the second chart, the 5.25% appears on the aggressive side of the data.



The first table shows that the mode and median investment return in 2007 for the funds surveyed is 8.0 percent.



The second table shows that the mode and median real rate of return for the funds surveyed is 4.50 percent. Only 5 of the 122 respondents had a higher assumed real rate of return, 5.50 percent. Eleven of the 122 respondents had the same assumed real rate of return as OPERS, 5.25 percent. 106 of the 122 respondents had lower assumed real rates of return.

Although Mercer included the NASRA survey data in the experience study, the main analysis used in support of their best-estimate investment return assumption of 7.50 percent was a forward-looking model using their own capital market assumptions and the plan's target asset allocation. We concur with this approach for developing an investment return for the plan. The model produced a compound annual return of 7.74 percent which was rounded down to 7.50 percent. The 7.50 percent investment return assumption implies an expected real rate of return of 4.75 percent.

Mercer also used their model with capital market assumptions from the Oregon Investment Council's investment consultant. These assumptions were significantly more optimistic and produced an expected median return of 9.7 percent. This appears to be outside the range of reasonableness for a long-term assumption.

Similar to Mercer, we use the building block approach using forward-looking capital market assumptions when developing an investment return assumption. We have performed a similar analysis using up-to-date capital market assumptions.

To analyze the expected real return, we used the plan's target asset allocation as provided by Oregon PERS and as shown on the Oregon Investment Council website.

<b>Asset Category</b>	<b>Asset Allocation</b>
Public Equities	46%
Private Equities	16%
Fixed Income	27%
Real Estate	11%
Total	100%

We reviewed capital market assumptions developed and published by the following six independent consulting firms:

- Strategic Investment Solutions
- J.P. Morgan
- NEPC
- PCA
- SunGard
- Tower Watson

For the inflation assumption, we used the Oregon PERS assumption in the valuation report of 2.75%, which appears reasonable since the average of the independent consulting firms inflation assumption is 2.71% as shown in the table below. For the expense assumption, we relied upon the analysis in the Mercer Experience Analysis dated July 31, 2009 which developed an expense load of 0.25%.



Given the plan's current asset allocation and the investment consultant's capital market assumptions, the development of the average nominal return, net of administrative and investment expenses, is provided in the following table:

Investment Consultant	Investment Consultant Expected Nominal Return*	Investment Consultant Inflation Assumption	Expected Real Return (2)-(3)	Actuary Inflation Assumption	Expected Nominal Return (4)+(5)	Plan Incurred Expense Assumption	Expected Nominal Return Net of Expenses* (6)-(7)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	8.29%	3.25%	5.04%	2.75%	7.79%	0.25%	7.54%
2	8.25%	3.00%	5.25%	2.75%	8.00%	0.25%	7.75%
3	7.93%	2.50%	5.43%	2.75%	8.18%	0.25%	7.93%
4	7.51%	2.00%	5.51%	2.75%	8.26%	0.25%	8.01%
5	8.08%	2.50%	5.58%	2.75%	8.33%	0.25%	8.08%
6	9.07%	3.00%	6.07%	2.75%	8.82%	0.25%	8.57%
<b>Average</b>	<b>8.19%</b>	<b>2.71%</b>	<b>5.48%</b>	<b>2.75%</b>	<b>8.23%</b>	<b>0.25%</b>	<b>7.98%</b>

\*The return assumption is based on arithmetic average.

We have determined for each firm the expected nominal return rate, then subtracted that firm's expected inflation to arrive at their expected real return in col. (4). Then we have added back our 2.75% inflation assumption to get expected nominal return in col. (5) and subtracted 0.25% for expenses to get a net nominal return. As the table shows, the range for the one-year returns is from 7.54% to 8.57%, with the average one-year return of the six firms of 7.98%, which is 0.02% below the current Oregon PERS assumption of 8.00%.

In addition to examining the expected one-year return, it is important to review anticipated volatility of the investment portfolio and understand the range of long-term net return that could be expected to be produced by the investment portfolio. Therefore, the following table provides the 25th, 50th, and 75th percentiles of the 20-year geometric average of the expected nominal return, net of expenses, as well as the probability of exceeding the current 8.00% assumption.

Investment Consultant	Distribution of 20-Year Average Geometric Net Nominal Return			Probability of exceeding 8.00%*
	25th	50th	75th	
(1)	(2)	(3)	(4)	(5)
1	5.14%	6.89%	8.66%	33.6%
2	5.16%	7.01%	8.90%	36.1%
3	5.58%	7.30%	9.05%	39.3%
4	5.68%	7.39%	9.12%	40.5%
5	5.23%	7.22%	9.26%	39.8%
6	5.97%	7.83%	9.72%	47.6%
<b>Average</b>	<b>5.46%</b>	<b>7.27%</b>	<b>9.12%</b>	<b>39.48%</b>

\*Plan's current return assumption net of expenses

None of the capital market assumptions provided by the investment consulting firms indicate there is more than a 47.6% chance of exceeding the current assumption. Furthermore, the average results of all six firms indicate there is only a 39% chance that the plan will produce an average return that exceeds 8.00% over the next 20 years. These results imply that the 8.0% assumption is on the high end of reasonableness.

Mercer's capital market analysis came to a similar conclusion and, as a result, Mercer recommended 7.5% as their best-estimate assumption in their most recent experience study.

Another factor that enters into the assumption setting is the handling of the reserves when calculating the actuarial value of assets for the System. Oregon PERS maintains several reserves within the System fund--the Contingency reserve, the Capital Preservation Reserve and the Tier 1 Rate Guarantee reserve. The reserves are built up from investment earnings in excess of the actuarial assumptions using the guidelines for establishing the reserves set forth in the statutes. These reserves remain in the fund but have historically been excluded from the valuation assets for all purposes, per Mercer's valuation report. As a result, the actuarial value of assets used in the valuation report experiences a lower investment return than the overall system investment return, until such time as the reserves are deployed. This would support a slightly lower return for the actuarial value of assets assumption.

In conclusion, we recommend that Oregon PERS continue its biennial assessment of the investment return assumption. While 8.0% is the predominant investment return assumption among the peer group, Montana recently changed their assumption to 7.75%, which is a trend we are seeing elsewhere as well. Capital market analysis—both ours and Mercer's—indicated that 8.0% is on the high end of the results. Also, excluding the reserves from the valuation assets reduces the rate of return from that earned by the System in total.

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**Investment Return Assumption – Variable Accounts**

The expected investment return on the variable account was also modeled using a forward-looking model using Mercer’s capital market assumptions and the plan’s target asset allocation. The model produced a compound annual return of 8.17 percent which was rounded up to 8.25 percent. Mercer recommended rounding up because this assumption is used to project benefits rather than discount liabilities and this would provide a conservative estimate of the liabilities for this benefit. In addition, they recommended that the variable account investment return be at least 50 points higher than the regular account return. We find no reason to disagree with this method. Currently, the plan uses an 8.50 percent return on the variable account return. Given the 8.0 return assumption on the regular account, this assumption is supportable. If the Board were to consider lowering the regular account investment return assumption, consideration could be given to lowering the variable account return by similar percentage points.

**Real Wage Growth/ Payroll Growth**

The real wage growth assumption of 1.0 percent is supported by the historical data presented in the experience study. The payroll growth assumption of 3.75 percent is consistent with a price inflation assumption of 2.75 percent and a real wage growth assumption of 1.0 percent.

**Member Pay Increase Assumption**

Assumed rates of pay increase are often constructed as the total of several components:

Base salary increases -- base pay increases that include price inflation and general “standard of living” or productivity increases.

An allowance for Merit, Promotion, and Longevity – This portion of the assumption is not related to inflation.

In the context of a typical pay grid, pay levels are set out for various employment grades with step increases for longevity:

The base salary increase assumption reflects overall growth in the entire grid, and the Merit, Promotion, and Longevity pay increase assumption reflects movement of members through the grid, both step increases and promotional increases. This is based on longevity and job performance. In most models, it is recognized that step increases and promotions are very rare late in careers. Thus, this allowance should trail away from relatively high levels for young or short service members to virtually nothing late in careers. We would expect that, as members approach retirement, this component would fade away.

Mercer analyzed the merit increases (salary increases after removing the effects of real wage growth) at each level of service with experience separated by School Districts, Other General Service, and Police & Fire. This is an appropriate methodology. The proposed rates are reflective of Plan experience after reflecting moderate smoothing and constraining the rates to non-negative values. The proposed rates are reasonable.

### **Sick leave**

Mercer analyzed the effect of unused sick leave on the final average pay separated by gender and employee group. The proposed assumption was set giving partial credibility to both current experience and historical rates. This appears to be a reasonable approach.

### **Vacation Pay**

The valuation report includes an assumption regarding lump sum payment of unused vacation pay and augmenting the final average salary. The experience study does not mention this assumption. An assumption should be made for this provision, but we cannot comment on the reasonableness of the actual rates chosen. We recommend this assumption be studied in the next experience study.

### **OPSRP Administrative Expenses**

The OPSRP administrative expense assumption of \$6.6 million per year appears consistent with the actual administrative expense experience included in the asset reconciliation. OPSRP administrative expenses during 2008 and 2009 were \$6.9 million and \$6.7 million, respectively.

## **SUMMARY**

In summary, the set of actuarial assumptions appear to be reasonable. However, we recommend implementing an additional assumption regarding the relative value of the annuity benefit and the lump sum option when using the total lump sum assumption at retirement and the refund of contributions at vested termination. In addition, we recommend giving more weight to historical experience when performing the next experience study.

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## SECTION 3

### REVIEW OF HEALTH CARE COST METHODS AND ASSUMPTIONS

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## REVIEW OF HEALTH CARE COST ASSUMPTIONS

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### **RHIPA Participation**

The Retiree Health Insurance Premium Account is a program for pre-Medicare retirees. State of Oregon retirees are offered coverage at a subsidized premium rate. Actual experience during the study period indicated slightly less than eight percent of pre-Medicare retirees were participating. The prior participation assumption was 11 percent. The assumption was set to nine percent. This appears reasonable.

### **RHIA Participation**

The Retiree Health Insurance Account is a program for Medicare-eligible retirees. Retirees enrolled in a PERS-sponsored health plan receive a subsidy of \$60 per month to defray the cost of the premium. Actual experience during the study period indicated roughly 41 percent of healthy Medicare-eligible retirees were participating. The prior participation assumption was 50 percent. The assumption was set to 42.5 percent. This assumption appears reasonable.

Actual experience during the study period indicated roughly 17 percent of disabled Medicare-eligible retirees were participating. The prior participation assumption was 25 percent. The assumption was set to 20 percent. This assumption appears reasonable.

### **Medical Trend Rates**

The trend model chosen by Mercer starts at 7.0 percent in 2009 and grades down slowly to 4.5 percent. Some actuaries choose to use higher initial rates and grade down to the ultimate rate more quickly, but the Mercer approach is a valid one and appears reasonable.

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## SECTION 4

### REVIEW OF ACTUARIAL VALUATION METHODS AND PROCEDURES

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## REVIEW OF ACTUARIAL VALUATION METHODS AND PROCEDURES

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### **I. Background:**

An actuarial valuation is a detailed statistical simulation of the future operation of a retirement system using the set of actuarial assumptions adopted by the Board.

The actuarial values generated from this process are based not only on these assumptions, but also on the additional assumptions built into each actuarial firm's pension valuation software.

Our scope for performing the review did not include a complete replication of the valuation results as determined by Mercer at December 31, 2009. Rather, we reviewed a number of sample test lives from Mercer in great detail, and made our determinations as to whether the methods and assumptions being employed were being done so properly. In addition, we compared the benefit calculations provided by Oregon Public Employees Retirement System for recent retirees against projected benefits from the Mercer valuation system. We reviewed the report in order to examine the aggregate results and conclusions of this actuarial valuation.

Though this approach is not intended to meet the rigors of a full scale replication of results, it still serves as a strong indicator of the appropriateness of the assumptions and methods being used to value the liabilities and determine the costs for these plans.

### **II. Actuarial Cost Method:**

Although the Entry Age Normal cost method is the most widely used cost method in the public sector, the Projected Unit Credit cost method, used by OPERS, is still a commonly used method. The projected unit credit cost method is one of the six currently accepted cost methods under GASB No. 25 and is a reasonable method for this plan.

One factor worth noting is that GASB's Preliminary Views on Pension Accounting and Financial Reporting by Employers specifies the Entry Age Normal cost as the only method for determining the Annual Required Contribution (ARC). It does not affect what cost method is used for funding purposes. However, if GASB's final accounting requirements only allow the Entry Age normal cost method, then using another method for funding would result in multiple valuations and additional calculations.



**III. Asset Method and Reserving:**Actuarial Value of Assets

The actuarial value of assets (AVA) equals the market value of assets, excluding the Contingency Reserve, the Capital Preservation Reserve and the Rate Guarantee Reserve. As can be seen below, the actuarial value of assets has stayed fairly close to market value of assets (MVA), within a 5% corridor for the 7 years shown below. This is a reasonable approach as long as this corridor is monitored to ensure that the values do not diverge significantly.

<b>System-Wide Assets (in millions)</b>							
Prior to adjustment for pre-SLGRP Liabilities and excluding side accounts							
	Tier 1/Tier 2	OPSRP	Contingency and Capital Preservation Reserve	Rate Guarantee Reserve	AVA	MVA	AVA/MVA
12/31/2009	\$ 43,251.1	\$ 445.4	\$ 653.1	\$ (441.8)	\$ 43,696.5	\$ 43,907.8	99.52%
12/31/2008	38,565.8	270.5	653.2	(978.5)	38,836.3	38,511.0	100.84%
12/31/2007	51,586.8	275.1	653.2	1,889.2	51,861.9	54,404.3	95.33%
12/31/2006	48,912.5	151.4	295.3	1,635.4	49,063.9	50,994.6	96.21%
12/31/2005*	44,828.4	55.0	250.0	967.3	44,883.4	46,100.7	97.36%
12/31/2004	40,306.0	5.4	1,929.0	355.0	40,311.4	42,595.4	94.64%
12/31/2003	\$ 38,030.0	\$ -	\$ 1,221.0	\$ -	\$ 38,030.0	\$ 39,251.0	96.89%

\*Board deployed \$1,390 million, including all of Capital Preservation Reserve and most of the Contingency Reserve, transferring the funds to member and employer accounts and the Benefits in Force (retiree) Reserve.

Tier 1 Rate Guarantee Reserve

As mentioned above, the Rate Guarantee Reserve is excluded from all valuation results. Mercer recommended that exclusion in April 27, 2006 in their presentation to the Board, primarily because including it fails to treat the reserve as a true reserve only available for a single purpose and creates a mismatch between liabilities and asset values.

The Tier 1 Rate Guarantee Reserve (RGR) builds up in years when the fund earns more than the assumed investment return assumption. In those years, the Tier 1 guaranteed account balances are credited with 8% and the additional return on the Tier 1 account balances is credited to the RGR. In years when the fund earns less than the assumed investment return assumption, the RGR is used to credit the accounts to the extent possible. If the RGR does not cover the guaranteed return, then the RGR shows a deficit. Only excess investment returns on Tier 1 account balances can build up the reserves.

Mercer brought several issues to the Board's attention regarding the treatment of the negative RGR on May 29, 2009. The Board approved continued exclusion of the RGR deficit from valuation assets. Mercer's understanding is that if the deficit persists for five years, employers may be required to restore the RGR. Although the deficit RGR balance

dropped significantly, from \$978.5 M on December 31, 2008 to \$441.8 M on December 31, 2009, this is still an outstanding liability. Mercer’s valuation results clarify that the contributions shown did not include any potential future contribution to alleviate a negative RGR.

We recommend additional review of this issue, exploring options and estimating contribution impacts. While the markets may resolve the issue by providing excess returns, we recommend a proactive approach in reviewing the alternatives and in communicating the options.

#### **IV. Amortization Method:**

The unfunded accrued liability is amortized as a level percentage of payroll. The amortization periods are as follows:

Tier 1/Tier 2 Initial UAL as of December 31, 2007	20-year closed
Tier 1/Tier 2 New amortization bases for gains and losses between subsequent odd-year valuations	20-year closed
Retiree Healthcare Initial UAL as of December 31, 2007	10-year closed
Retiree Healthcare New amortization bases for gains and losses between subsequent odd-year valuations	10-year closed
OPSRP Initial UAL as of December 31, 2007	16-year closed
OPSRP New amortization bases for gains and losses between subsequent odd-year valuations	16-year closed

While the creation of new amortization bases for gains and losses is a practice more prevalent in the private sector, it is an acceptable method. Under GASB 25 and 43, the effective single amortization period created by the sum of the individual amortization payments cannot exceed 30 years. Currently the effective single amortization period for the pension UAL payment is stated at 30 years (which at the time of the issuance of this report we were not able to validate). This will need to be monitored in future valuations to make sure the annual required contribution used for GASB reporting purposes does not have an effective amortization period of greater than 30 years.

#### **V. Contribution Rate Collar:**

The rate collar is used by Oregon PERS to reduce volatility in contribution rates. Since Oregon PERS does not use an asset smoothing method of deferring asset gains/losses, the actuarial value of assets fluctuates significantly. This rate collar approach dampens the asset fluctuation impact on the contribution levels. The Board recently adopted a change in the rate collar from the 80% funded status “cliff” approach to a gradual transition in

contribution rates as funded status falls from 80% to 70%.

This is a reasonable approach to maintaining or increasing the funded status of the plan, while at the same time smoothing contribution volatility.

#### **VI. Data Process:**

In a major statewide system such as Oregon Public Employees Retirement System, it is often not practical or feasible to resolve each minor data issue with System staff. Mercer has provided a list of the data adjustments or assumptions made when preparing the raw data files for the valuation. We have reviewed the data adjustments and assumptions for reasonableness. While we have not performed a full reconciliation to be able to determine the nature of any changes in the data from December 31, 2008 to December 31, 2009, all data adjustments and assumptions appear to be reasonable and justifiable.

#### **VII. Test Lives:**

We reviewed sample test cases used for the December 31, 2009 valuation draft report. During the audit process, we also reviewed sample test cases used for the December 31, 2008 valuation report. Our quantitative analysis of the 2009 test cases is included in this report. Our findings in regard to valuation methodology are included for both the 2008 and 2009 test cases. We requested a number of sample cases from Mercer with intermediate statistics to assist us in analyzing the results. We combined this with our understanding of the plan provisions in an attempt to analyze the liability values produced by Mercer for these sample cases only.

We analyzed each possible decrement and each possible benefit stream within the decrement for each test cases. For most benefit streams, we found the present value of benefits to be well within the acceptable tolerance limits for differences. In cases where the discrepancy was large on a percentage basis, it was for a benefit stream that made up a marginal portion of the total liabilities. Identifying the source of the discrepancy in these cases would result in de minimis impact on the overall results.

In our review of the test cases, we identified the following issues and provided a summary to Mercer for comment. Issues identified which were responded to and are now considered resolved have not been included here.

##### **1. *Disability Benefits – OPSRP Conversion to Normal Retirement***

GRS Finding: Members covered under the OPSRP plan and eligible for a disability benefit will receive a specified benefit until normal retirement eligibility at which time they receive a normal retirement benefit. The normal retirement benefit is based on final average salary adjusted from date of disability to normal retirement as well as service assuming service has continued to accrue since date of disability. For the police and fire

test case reviewed, the member would be eligible for normal retirement at age 55 with 25 years of service. We found that Mercer was calculating the normal retirement conversion benefit assuming normal retirement age of 55. However, we found that the pre-retirement benefit was being valued until age 60, and the normal retirement conversion benefit was being valued assuming a starting age of 60. The benefit streams should be valued with a change age of 55, consistent with the benefit calculation.

*Mercer Explanation:* Mercer indicates that the conversion age is not flexible enough to change the conversion age for members that meet the 25 years of service eligibility requirement. They cite the small percentage of total liabilities that OPSRP makes up of total liabilities and the even smaller percentage attributable to disability benefits as justification for the approximation.

*Resolution:* Given the small magnitude of the potential impact and the inflexibility of the Mercer valuation system in this regard, we agree it is reasonable to leave the current methodology in place.

## ***2. Lump Sum and Return of Contribution Assumptions for Tier 1 and Tier 2***

*GRS Finding:* Our major concern, as described in the pension assumption section, lies in the application of the lump sum at retirement and refund of contribution assumptions. The assumptions rely on participants making irrational economic choices and undervalue the retirement and termination decrement liabilities. For example, in one of the more extreme cases, in the Test Case 2 – Tier 2 General Service, it is assumed that there is a probability that a member with a \$0.00 contribution balance will give up a five-figure deferred benefit in exchange for a return of contributions. Removing this assumption in this particular instance, increases the present value of termination benefits roughly 13 percent and total benefits by roughly 2 percent.

*Mercer Explanation:* Regarding the retirement lump sum option election, Mercer cites the graded structure of the assumption (5.5 percent graded down by 0.5 percent increments until a 0.0 percent ultimate assumption is reached). They also indicated that members *do*, in fact, make slightly economically irrational choices (at least on an actuarial basis) due to the appeal of the lump sum.

Regarding the termination refund election Mercer indicates that they have set the refund assumption at a lower level than historical experience indicated in the experience study in anticipation of this election behavior decreasing over time.

*Resolution:* We agree that the Mercer assumption accurately reflects the best estimate assumption in terms of percentages electing to take a lump sum at retirement or a refund of contributions at termination. The percentage electing a lump sum at retirement will likely grade down over the next few years. We also agree that the percent of members taking a refund of contributions at termination will be slightly lower than observed in the prior

experience period. *However*, this assumption does not accurately reflect the economic value of benefits. While five percent of new retirees in 2011 may elect to have their benefit paid as a total lump sum, those five percent are likely retirees for whom there is not significant loss of present value of benefits by doing so. Similarly, while a significant portion of vested terminations may choose to take a refund rather than their deferred vested benefit, likely *none* of them are participants who have a \$0.00 contribution balance. This assumption should be modified to reflect the relative value of benefits to avoid reducing liabilities where no true reduction exists.

On the following pages, the quantitative results of our review of the 2009 test cases are shown. The first table on each page shows the present value of each benefit stream. The “GRS Match” column represents the calculated present value using our best attempt at matching the Mercer valuation methodology. The second table on each page shows the present value of benefits by decrement only. The “GRS Recommend” column represents the calculated present value assuming corrections are made for the items described above and assuming that members will take the most valuable benefit available to them.

The first four pages contain active pension test cases; the fifth page contains the active healthcare test case; and the sixth page contains one retiree pension test case (with two benefit streams) and four retire healthcare test cases.

**OREGON PUBLIC EMPLOYEES RETIREMENT SYSTEM**  
 Actuarial Review of Pension and Health Plans - December 31, 2009  
 Comparison of Present Value of Benefits - Pension

<b>Actives</b>	<b>Test Case 1 - Tier 2 Police and Fire</b>		
<u>Basic Data:</u>	Current Age	Credited Service	Sex
	29.246	11.250	F
<b>Present Value of Benefits (PVB)</b>	<b>GRS Match</b>	<b>Mercer</b>	<b>% Diff</b>
<u>Retirement:</u>			
Retirement Annuity	96,111.54	96,008.51	0.1%
Retirement Lump Sum	391.11	388.33	0.7%
Retirement Unit Purchase	207.79	206.80	0.5%
Retirement Reversionary Annuity	1,535.27	1,351.08	13.6%
<b>Total Retirement PVB</b>	<b>98,245.71</b>	<b>97,954.72</b>	<b>0.3%</b>
<u>Disability:</u>			
Ordinary Disability	3,378.61	3,366.27	0.4%
Duty Disability	1,132.79	1,128.79	0.4%
Ordinary Disability Reversionary Annuity	132.76	55.82	137.8%
Duty Disability Reversionary Annuity	47.45	23.95	98.1%
<b>Total Disability PVB</b>	<b>4,691.61</b>	<b>4,574.84</b>	<b>2.6%</b>
<u>Death:</u>			
Ordinary Death	134.20	134.20	0.0%
<b>Total Death PVB</b>	<b>134.20</b>	<b>134.20</b>	<b>0.0%</b>
<u>Withdrawal:</u>			
Deferred Annuity	12,451.28	12,633.56	-1.4%
Return of Contributions	1,060.04	1,060.04	0.0%
Deferred Lump Sum	322.67	334.09	-3.4%
Return of Contributions Upon Death During Deferral	20.83	103.89	-80.0%
Reversionary Annuity	295.59	288.56	2.4%
<b>Total Withdrawal PVB</b>	<b>14,150.41</b>	<b>14,420.14</b>	<b>-1.9%</b>
<b>GRAND TOTAL PVB</b>	<b>117,221.93</b>	<b>117,083.91</b>	<b>0.1%</b>

**OREGON PUBLIC EMPLOYEES RETIREMENT SYSTEM**  
 Actuarial Review of Pension and Health Plans - December 31, 2009  
 Comparison of Present Value of Benefits - **Pension**

<b>Actives</b>	<b>Test Case 2 - Tier 2 General Service</b>		
<u>Basic Data:</u>	Current Age 42.415	Credited Service 5.917	Sex F
<b>Present Value of Benefits (PVB)</b>	<b>GRS Match</b>	<b>Mercer</b>	<b>% Diff</b>
<u>Retirement:</u>			
Retirement Annuity	275,740.75	275,977.53	-0.1%
Retirement Lump Sum			0.0%
<b>Total Retirement PVB</b>	<b>275,740.75</b>	<b>275,977.53</b>	<b>-0.1%</b>
<u>Disability:</u>			
Ordinary Disability	11,693.69	11,693.52	0.0%
Duty Disability	756.26	755.77	0.1%
<b>Total Disability PVB</b>	<b>12,449.95</b>	<b>12,449.28</b>	<b>0.0%</b>
<u>Death:</u>			
Ordinary Death	-	-	0.0%
<b>Total Death PVB</b>	<b>-</b>	<b>-</b>	<b>0.0%</b>
<u>Withdrawal:</u>			
Deferred Annuity	48,765.80	48,413.51	0.7%
Return of Contributions	-	-	0.0%
<b>Total Withdrawal PVB</b>	<b>48,765.80</b>	<b>48,413.51</b>	<b>0.7%</b>
<b>GRAND TOTAL PVB</b>	<b>336,956.50</b>	<b>336,840.33</b>	<b>0.0%</b>

**OREGON PUBLIC EMPLOYEES RETIREMENT SYSTEM**  
 Actuarial Review of Pension and Health Plans - December 31, 2009  
 Comparison of Present Value of Benefits - Pension

<b>Actives</b>	<b>Test Case 3 - Tier 1 School District</b>		
<u>Basic Data:</u>	Current Age	Credited Service	Sex
	45.488	24.083	M
<b>Present Value of Benefits (PVB)</b>	<b>GRS Match</b>	<b>Mercer</b>	<b>% Diff</b>
<u>Retirement:</u>			
Retirement Annuity	258,725.60	257,886.24	0.3%
Retirement Lump Sum	8,310.99	8,296.35	0.2%
<b>Total Retirement PVB</b>	<b>267,036.59</b>	<b>266,182.59</b>	<b>0.3%</b>
<u>Disability:</u>			
Ordinary Disability	4,606.29	4,635.82	-0.6%
Duty Disability	169.07	170.34	-0.7%
<b>Total Disability PVB</b>	<b>4,775.36</b>	<b>4,806.16</b>	<b>-0.6%</b>
<u>Death:</u>			
Ordinary Death	1,906.39	1,906.39	0.0%
<b>Total Death PVB</b>	<b>1,906.39</b>	<b>1,906.39</b>	<b>0.0%</b>
<u>Withdrawal:</u>			
Deferred Annuity	23,338.72	23,754.78	-1.8%
Return of Contributions	1,544.02	1,545.39	-0.1%
Deferred Lump Sum	1,515.93	1,493.98	1.5%
Return of Contributions Upon Death During Deferral	686.25	716.08	-4.2%
<b>Total Withdrawal PVB</b>	<b>27,084.92</b>	<b>27,510.22</b>	<b>-1.5%</b>
<b>GRAND TOTAL PVB</b>	<b>300,803.26</b>	<b>300,405.36</b>	<b>0.1%</b>



**OREGON PUBLIC EMPLOYEES RETIREMENT SYSTEM**  
 Actuarial Review of Pension and Health Plans - December 31, 2009  
 Comparison of Present Value of Benefits - Pension

<b>Actives</b>	<b>Test Case 4 - OPSRP Police and Fire</b>		
<u>Basic Data:</u>	Current Age	Credited Service	Sex
	34.732	5.333	M
<b>Present Value of Benefits (PVB)</b>	<b>GRS Match</b>	<b>Mercer</b>	<b>% Diff</b>
<u>Retirement:</u>			
Retirement Annuity	111,046.96	111,084.49	0.0%
<b>Total Retirement PVB</b>	<b>111,046.96</b>	<b>111,084.49</b>	<b>0.0%</b>
<u>Disability:</u>			
Ordinary Disability Before NR Conversion	2,398.21	2,398.21	0.0%
Duty Disability Before NR Conversion	1,060.46	1,060.46	0.0%
Ordinary Disability Death Before NR Conversion	170.15	170.15	0.0%
Duty Disability Death Before NR Conversion	72.77	72.77	0.0%
Ordinary Disability After NR Conversion	1,581.43	1,558.67	1.5%
Duty Disability After NR Conversion	847.56	838.85	1.0%
Ordinary Disability - Withdrawal before 10 years	19.83	19.77	0.3%
Death after Ordinary Disability Withdrawal	12.66	8.39	50.9%
<b>Total Disability PVB</b>	<b>6,163.07</b>	<b>6,127.26</b>	<b>0.6%</b>
<u>Death:</u>			
Ordinary Death	804.08	778.32	3.3%
<b>Total Death PVB</b>	<b>804.08</b>	<b>778.32</b>	<b>3.3%</b>
<u>Withdrawal:</u>			
Deferred Annuity	7,185.55	7,178.59	0.1%
Death During Deferral Period	105.35	105.23	0.1%
<b>Total Withdrawal PVB</b>	<b>7,290.90</b>	<b>7,283.81</b>	<b>0.1%</b>
<b>GRAND TOTAL PVB</b>	<b>125,305.01</b>	<b>125,273.88</b>	<b>0.0%</b>

**OREGON PUBLIC EMPLOYEES RETIREMENT SYSTEM**  
 Actuarial Review of Pension and Health Plans - December 31, 2009  
 Comparison of Present Value of Benefits - **Health**

<b>Actives</b>	<b>Test Case 1 - Tier 1 School District</b>		
<u>Basic Data:</u>	Current Age	Credited Service	Sex
	51.144	33.333	M
<b>Present Value of Benefits (PVB)</b>	<b>GRS</b>	<b>Mercer</b>	<b>% Diff</b>
<u>Retirement:</u>			
RHIA	1,156.51	1,119.31	3.3%
<b>Total Retirement PVB</b>	<b>1,156.51</b>	<b>1,119.31</b>	<b>3.3%</b>
<u>Disability:</u>			
Ordinary Disability - RHIA	3.17	3.19	-0.7%
Duty Disability - RHIA	0.15	0.17	-10.8%
<b>Total Disability PVB</b>	<b>3.32</b>	<b>3.36</b>	<b>-1.2%</b>
<u>Death:</u>			
Ordinary Death	5.13	5.14	-0.1%
<b>Total Death PVB</b>	<b>5.13</b>	<b>5.14</b>	<b>-0.1%</b>
<b>GRAND TOTAL PVB</b>	<b>1,164.96</b>	<b>1,127.80</b>	<b>3.3%</b>

**OREGON PUBLIC EMPLOYEES RETIREMENT SYSTEM**  
 Actuarial Review of Pension and Health Plans - December 31, 2009  
 Comparison of Present Value of Benefits - **Pension and HC, Retirees**

<b>Present Value of Benefits (PVB)</b>	<b>GRS</b>	<b>Mercer</b>	<b>% Diff</b>
Retiree Pension Benefit -			
50% Joint and Survivor with Pop-up	125,259.45	125,259.45	0.0%
Reversionary Annuity	4,889.83	4,889.83	0.0%
Retiree Healthcare Benefit -			
RHIA Case 1	5,911.63	5,911.63	0.0%
RHIA Case 2	7,691.69	7,694.64	0.0%
RHIPA Case 3	13,180.76	13,179.36	0.0%
RHIPA Case 4	29,045.27	29,017.62	0.1%

**VIII. Sample Benefit Calculations:**

Oregon Public Employees Retirement System staff provided benefit calculations for 11 retirees that retired from active status during 2009. We compared the actual benefits with those projected by the Mercer valuation system. In each case, the Mercer benefits were lower than actual. The culprit for at least part of the difference in each case was the beginning of year decrement timing used by Mercer. At the beginning of the year, the participant will have the least possible service, youngest attained age (or highest early reduction factor), and have the smallest accumulated contribution balances that they will have during the valuation year. As indicated in the assumption section, we recommend middle of year decrement timing.

Another factor that accounted for the differences between the Mercer projected benefit and the actual benefit was differences in the amount of sick time and vacation pay that went into the final average salary calculation. We expect that there is significant volatility in this particular area among individual participants. The deviation from the assumption for these few participants is not an indication that the current sick leave and vacation pay assumptions are not appropriate.

Aside from the decrement timing issue, the projected benefits produced by the Mercer valuation system are reasonable. Details of our findings are below:

#	Retiree Type	Optimal Benefit Formula	Projected Benefit From Mercer	Actual Straight Life Benefit at Retirement	Difference	Reasons for Difference
1	OPSRP GS	Full Formula	152.87	196.02	-22%	Timing of retirement: actual service higher, early retirement reduction less
2	Tier 1 GS	Formula Plus Annuity	5,038.77	5,998.37	-16%	Timing of retirement: actual service higher, early retirement reduction less Final Average Salary (sick leave and vacation pay adjustments in excess of assumption)
3	Tier 1 GS	Money Match	3,170.17	3,499.05	-9%	Timing of retirement: early retirement reduction less, actual accumulated contributions more
4	Tier 1 GS	Money Match	9,758.06	10,943.84	-11%	Timing of retirement: actual accumulated contributions more
5	Tier 1 GS	Money Match	4,056.84	4,738.18	-14%	Timing of retirement: actual accumulated contributions more
6	OPSRP GS	Full Formula	119.58	150.68	-21%	Timing of retirement: actual service higher, early retirement reduction less
7	Tier 2 GS	Full Formula	440.10	498.13	-12%	Timing of retirement: actual service higher Final Average Salary (sick leave and vacation pay adjustments in excess of assumption)
8	Tier 1 GS	Full Formula	1,358.45	1,482.86	-8%	Timing of retirement: actual service higher Final Average Salary (sick leave and vacation pay adjustments in excess of assumption)
9	Tier 1 GS	Full Formula	1,055.41	1,061.90	-1%	Timing of retirement: actual service higher
10	Tier 1 GS	Money Match	5,079.96	5,414.15	-6%	Timing of retirement: actual accumulated contributions more
11	Tier 1 GS	Full Formula	779.78	813.35	-4%	Timing of retirement: actual service higher Final Average Salary (sick leave and vacation pay adjustments in excess of assumption)

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## SECTION 5

### REVIEW OF CONTRIBUTION RATE DETERMINATION

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## REVIEW OF CONTRIBUTION RATE DETERMINATION

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GRS was to analyze the funding method being used and verify its computation. The goal here is to start with the Actuarial Accrued Liabilities and the Normal Costs that are developed from the data and valuation software and compare this to the Assets in the system. The difference between the two, the Unfunded Actuarial Accrued Liability (UAAL) in conjunction with the Normal Cost forms the basis of the contributions that the Actuary recommends the system make in order to ensure that benefits can be provided for current and future retirees.

### FINDINGS:

We were able to replicate the following:

- Tier 1/ Tier 2 SLGRP, School Districts, and Independent Employers normal cost rates
- OPSRP, RHIA and RHIPA normal cost rates
- Amortization bases and amortization payments for Tier 1/ Tier 2 SLGRP, School Districts, Independent Employers
- Amortization bases and amortization payments for OPSRP, RHIA and RHIPA
- Rate collar adjustments
- Side account adjustments

The calculations were reasonable and consistent with actuarial practice.

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## SECTION 6

### REVIEW OF ACTUARIAL VALUATION REPORT

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## REVIEW OF ACTUARIAL VALUATION REPORT

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### GASB NOS. 25 AND 43 DISCLOSURE:

GASB (Governmental Accounting Standards Board) sets out guidelines for financial accounting and reporting for state and local government entities. Under GASB Nos. 25 and 43, the actuarial valuation reports for OPERS must disclose a set of financial statistics. These include:

- Schedule of Funding Progress
- Schedule of Employer Contributions
- Notes to Required Supplementary Information

### Findings:

Based on the information we have to date, we were not able to replicate the Equivalent Single Amortization Period (30 years for Pension, 10 years for RHIA and RHIPA) shown in the Notes to Required Supplementary Information. There were no other issues to report.

### VALUATION REPORT:

GRS reviewed the December 31, 2009 valuation report for scope as well as content to determine if actuarial statistics were being reflected fairly and if the details of the plan were being correctly communicated.

The scale of the Oregon Public Employees Retirement System actuarial valuation report can be somewhat overwhelming. There are several factors contributing to the large number of exhibits and the length of the report.

- The existence of three benefit tiers (Tier 1, Tier 2 and OPSRP) as well as separate employee groups within those tiers (Police and Fire, School Employees, General Service)
- Reporting results separately for SLGRP, School Districts and Independent Employers
- Asset reserving that requires additional exhibits

These factors being taken into consideration, we consider the scope and content of Mercer's report to be effective in communicating the financial position and contribution requirements of the Oregon Public Employees Retirement System. The report is in accordance with standard actuarial reporting methodologies for public sector systems.

The assumption section and plan provision sections appear to include all major assumptions and provisions used in the valuation with the exception of current premium amounts used in the determination of the RHIPA liability. These amounts should be included in the valuation report as of December 31, 2010.

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## SECTION 7

### BENCHMARKING

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## **Benchmarking**

Benchmarking is a comparison of Oregon PERS to its peer group on certain assumptions, funding and contribution levels. While it is informative to see where Oregon PERS falls in relation to other Systems, it is important to keep in mind that there are other issues affecting the comparison between systems. There are many differences that can impact the analysis, such as actuarial funding methods, participation in Social Security, DC or hybrid plan features, different tiers of benefits and different funding policies.

## **Peer group**

GRS worked with Oregon PERS staff to develop a peer group and the issues for comparison. All of the plans are multiple-employer cost-sharing plans. The peer group is shown below, along with a brief description of the characteristics of the Plans:

- Arizona State Retirement System (AZ). Defined benefit. Covers general service and teachers. Participates in Social Security.
- Colorado Public Employees Retirement Association (CO). Defined benefit. Covers general service and teachers. Does *not* participate in Social Security.
- Idaho Public Employees Retirement System (ID). Defined benefit. Covers general service, fire and police and teachers. Participates in Social Security.
- Montana Public Employees Retirement System (MO). Defined benefit. Covers general service and teachers. Participates in Social Security.
- Nevada Public Employees Retirement System (NV). Defined benefit. Covers general service and teachers. Does *not* participate in Social Security.
- New Mexico Public Employees Retirement Association (NM). Defined benefit. Covers general service and fire and police. Participates in Social Security.
- Oregon Public Employees Retirement System (OR). Provides defined benefit and defined contribution (IAP) benefits. Covers general service, police and fire and teachers. Participates in Social Security.
- Utah Retirement System (UT). Comprised of several plans. Public Employees' Non-Contributory System for existing employees and hires before July 1, 2011 (UT-NonC). Public Employees' Contributory Hybrid Plan—for new employees beginning July 1, 2011 (UT-Tier 2). Covers general service, fire and police, and teachers. Participates in Social Security.
- Washington Public Employees' Retirement System (WA). Comprised of 3 plans. Plan 1 is a defined benefit plan for participants who joined by September 30, 1977 (WA Plan 1). Plan 2 is a defined benefit plan for participants who joined between October 1, 1977 and 2002, unless they opted to move to Plan 3 (WA Plan 2). Plan 3 is a combined defined benefit/defined contribution plan (WA Plan 2/3) for participants hired after 2002, in which they can choose to be in Plan 2 or Plan 3. Covers general service. Participates in Social Security.
- Wyoming Retirement System Public Employees Pension Plan (WY). Defined benefit. Covers general service, teachers and fire and police. Participates in Social Security.

**Source of Data**

The comparison data used in this benchmarking study is primarily from the Public Fund Survey, sponsored by the National Association of State Retirement Administrators (NASRA) and the National Council on Teacher Retirement. Most of the information compiled in these survey results is from the 2009 plan years, updated with 2010 valuation results, if available. In addition, the information provided in annual CAFRs has been incorporated when necessary to supplement the survey information.

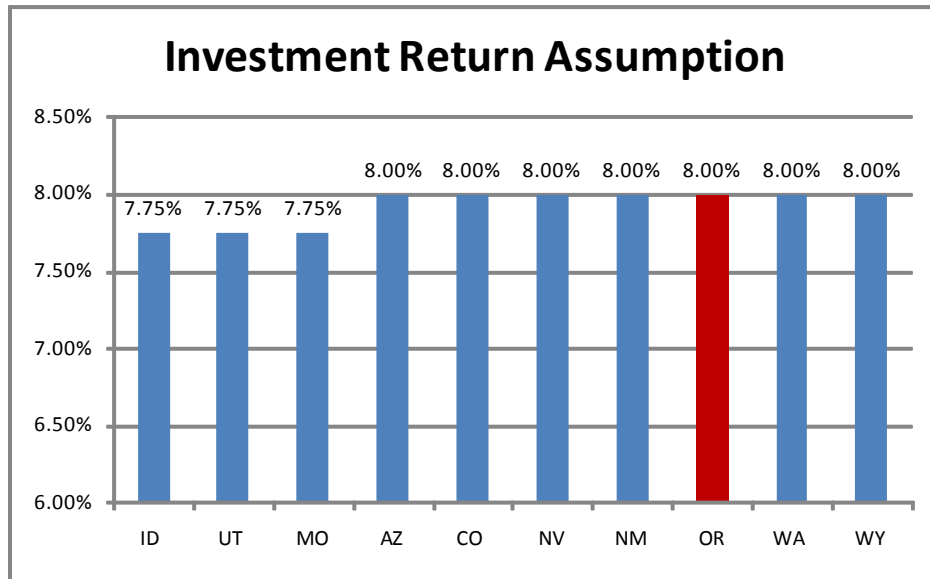
For Oregon PERS, we updated the information to reflect the June 30, 2010 valuation results.

**Rate of Return Assumption**

The investment return assumption is one of the principal assumptions in any actuarial valuation of a retirement plan. It is used to discount future expected benefit payments to the valuation date, in order to determine the liabilities of the plan. Even a small change to this assumption can produce significant changes to the liabilities and contribution rates.

Actuaries are required to comply with Actuarial Standards of Practice No. 27 (ASOP 27) in setting economic assumptions for retirement plans, including the assumed investment return rate. The standard requires the actuary to identify the components of each assumption, to evaluate relevant data, and to set a best-estimate range.

Below is a table providing a comparison of the investment return assumptions used by the peer retirement systems. While we do not recommend setting an assumption based on prevalence information, it is still informative to see where Oregon PERS, which has an 8.0% investment return assumption, compares to its peers. As can be seen, Oregon PERS has the same assumption of 8.0% as 7 of the 10 plans in the peer group, with three systems at a lower assumption of 7.75%. Montana reduced its investment return assumption effective June 30, 2010 from 8.0% to 7.75%.



While 8.0% is the predominant investment return assumption among the peer group, Montana recently changed their assumption to 7.75%, which is a trend we are seeing elsewhere as well. Also, while it is informational to compare Oregon PERS' investment return to other Systems, we recommend that the building block approach using forward-looking capital market assumptions be used to develop an investment return assumption. The results of the capital market study included in our review of the economic assumptions showed an average arithmetic return of 7.98%, a median 20-year average geometric net nominal return of 7.27%, and an average probability of 39% of exceeding the 8.00% assumption over a 20-year time horizon. Capital market analysis—both ours and Mercer's—indicates that 8.0% is on the high end of the range of reasonable assumptions. In addition, excluding the reserves from the valuation assets reduces the rate of return from that earned by the System in total. This leads us to recommend that Oregon PERS continue its biennial assessment of the investment return assumption.

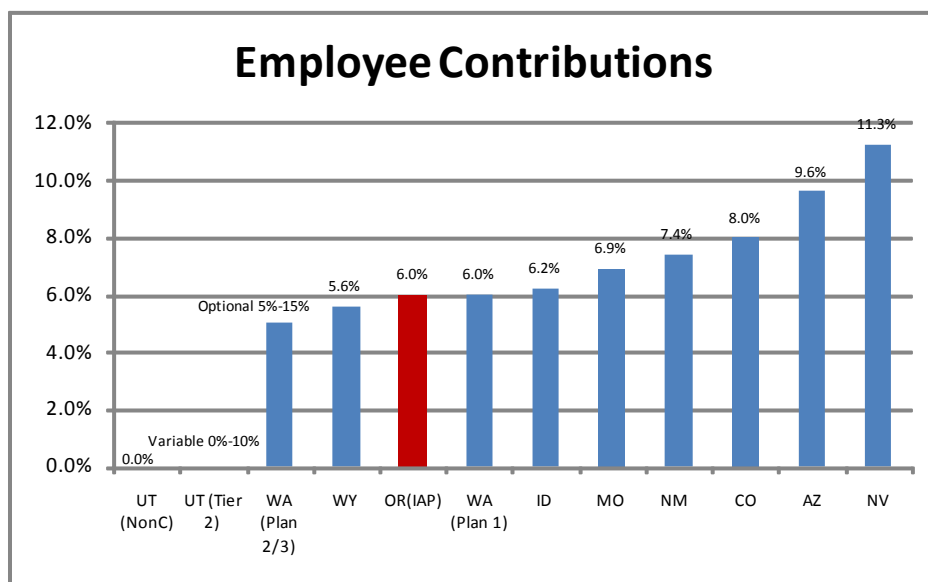
### **Actuarial Cost Method**

Oregon PERS and Arizona are the two systems in the peer group that use the Projected Unit Credit cost method. Washington Plan 2/3 uses the Aggregate method and the remaining 7 systems use the Entry Age Normal cost method. The projected unit credit cost method is one of the six currently accepted cost methods under GASB No. 25 and is a reasonable method for this plan.

One factor worth noting is that GASB's Preliminary Views on Pension Accounting and Financial Reporting by Employers specifies the Entry Age Normal cost as the only method for determining the Annual Required Contribution (ARC). It does not affect what cost method is used for funding purposes. However, if GASB's final accounting requirements only allow the Entry Age normal cost method, then using a method other than for funding would result in multiple valuations and additional calculations.

## Employee Contributions

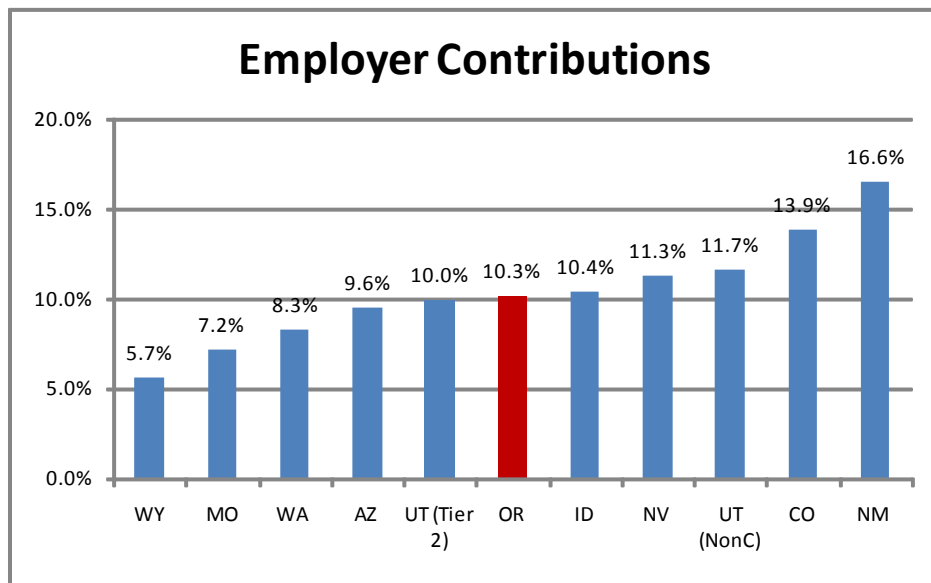
The fixed employee contribution rates range from 0.0% to 11.3.0% as shown below. Oregon PERS is on the low end with employee contributions of 6.0%, which go into the Individual Account Plan (IAP). Note that Utah and Washington have tiered plans with different employee contributions. Utah has a non-contributory plan for employees hired before July 1, 2011 and has created a Tier 2 hybrid DB/DC for employees hired after that date that requires employees to contribute some percent of salary if the employer's 10% contribution does not fund the required contribution. Washington's Plan 1 is a closed plan for participants hired before September 30, 1977 and has a 6.0% employee contribution rate. Washington's Plan 2/3 is a hybrid DB/DC plan for employees hired after that date that allows employees to contribute between 5%-15% of pay to the defined contribution plan. Of the plans with fixed employee contributions, Colorado and Nevada are at the high end since they do not participate in Social Security. Colorado passed legislation in 2010 that increases the employee contribution from that shown below by 2.5% for one year ending June 30, 2011 while decreasing employer contributions by 2.5% for the year.



## Employer Contributions

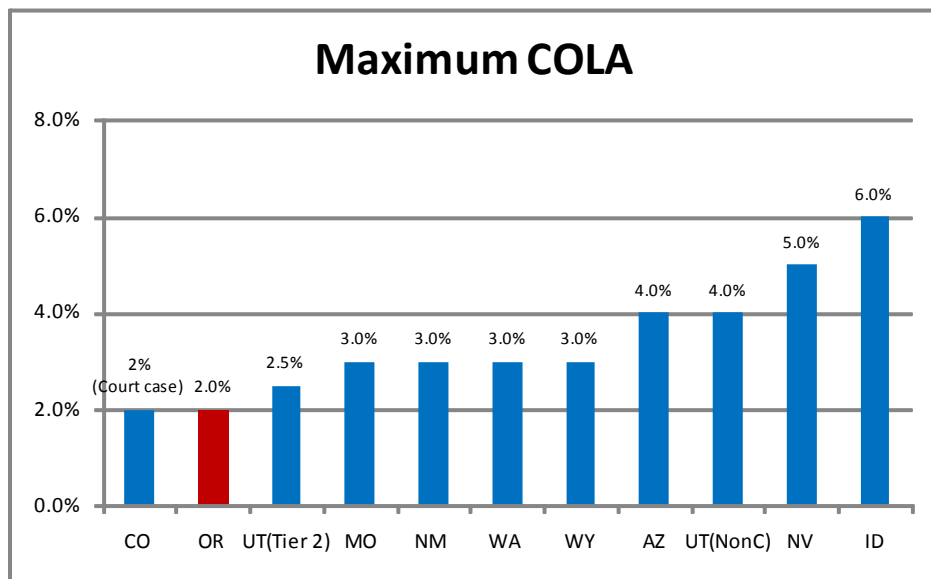
The employer contribution rates range from 5.7% to 16.6% as shown on the following graph. Oregon PERS is in the middle of the peer group with a 10.25%\* contribution rate, after reflecting Side Accounts and Pre-SLGRP Liabilities. Colorado and Nevada do not participate in Social Security, so their employer contribution levels are at the higher end of the peer group. Colorado passed legislation in 2010 that decreases the employer contribution from that shown below by 2.5% for one year ending June 30, 2011 while increasing employee contributions by 2.5% for that same year. The employer contributions shown below may vary from year to year and also may vary within the plans for different employers and member groups.

\*Source: Oregon Public Employees Retirement System Tier 1/Tier2 and OPSRP Contribution Rates (Excluding Retiree Healthcare and IAP), July 23, 2010, "December 31, 2009 Actuarial Valuation" presented by Mercer



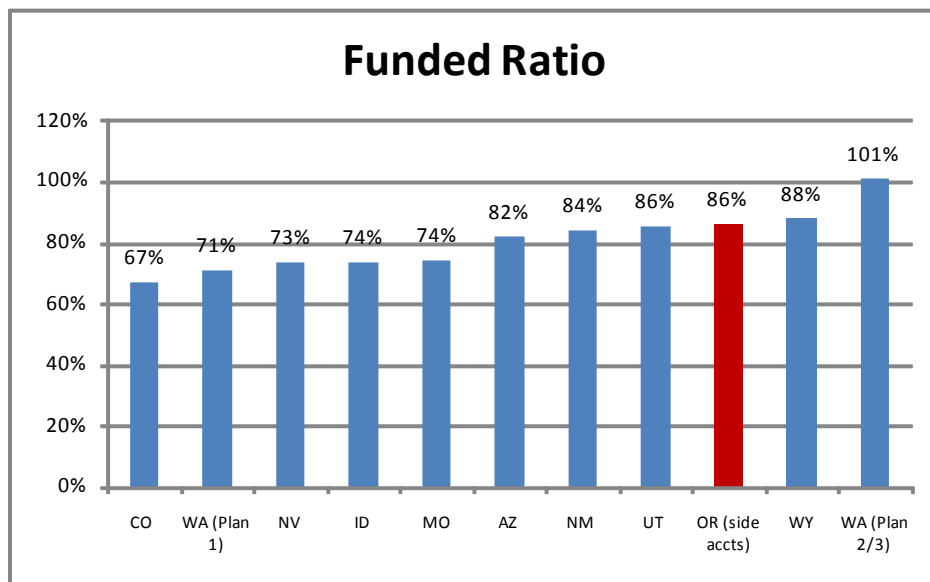
**Maximum Cost-of-Living Increases**

The maximum cost-of-living increases range from 2.0% up to a maximum of 6.0% as shown below. In the peer group, Oregon PERS and Colorado have the two lowest maximum COLAs. Colorado recently changed their COLA from 3.5% to 2.0% for current retirees. This change is currently being challenged in Court. The average maximum COLA for the peer group is 3.5%. Note that some of these are COLAs are automatic, some are adhoc, some are compound, some are simple, some are guaranteed, and some are granted only after a certain investment, inflation or funded status threshold is met.



## **Funded Ratio**

The following shows the funded ratios of the peer group. As can be seen, Oregon PERS has a funded ratio of 86.0%, including side accounts as of December 31, 2009\*, which is the third highest ratio of the peer group. One of the System's with a higher funded status is the Washington Plan 2/3 which is a hybrid DB/DC plan for more recently-hired participants. Some of the funds in the peer group, including Oregon, have been updated for 2010 valuation results, while some of the funds' results are based on 2009 valuations and therefore do not reflect 2009 asset performance.

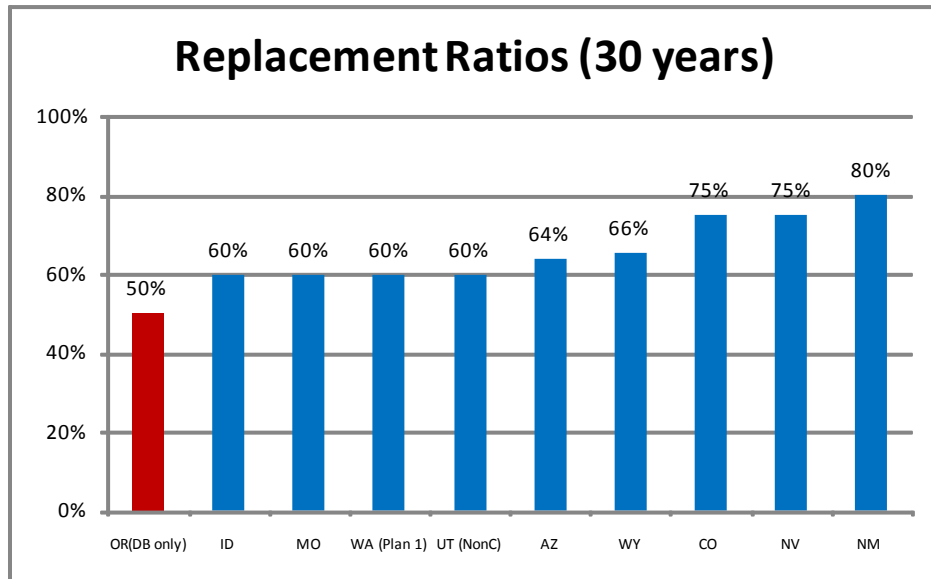


\*Source: Oregon Public Employees Retirement System Tier 1/Tier2 and OPSRP Combined Funded Status (Including Side Accounts), July 23, 2010, "December 31, 2009 Actuarial Valuation" presented by Mercer

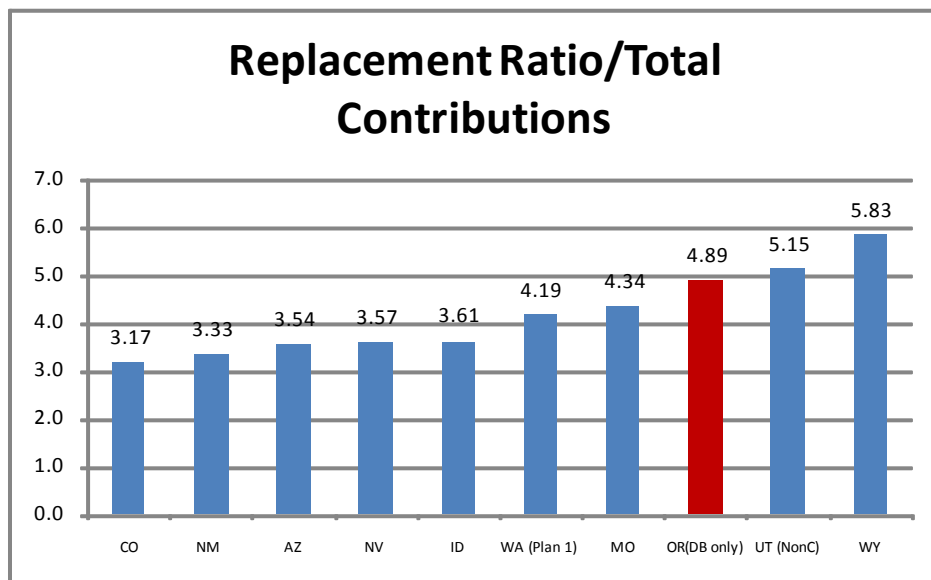
## **Replacement Ratios at 30 years of service**

Replacement ratios show the percentage of final salary replaced by plan benefits at retirement. We are assuming a career of 30 years and are only including the defined benefits in this analysis. The following table shows that the full formula for Oregon PERS provides a 50% replacement ratio at 30 years of service. Compared to the peer group, this is the lowest ratio, but note that this ratio does not reflect any replacement ratio from the Money Match formulas or IAP contributions. This graph includes the closed Washington Plan 1 and the closed Utah Non-Contributory defined benefit plans but excludes their hybrid DB/DC plans for newer entrants. Colorado and Nevada have 2 of the highest 3 replacement ratios because these Systems' provide a higher benefit (and often require higher employee and employer contributions) to make-up for the loss of the Social Security benefit.





Replacement ratios alone do not tell the whole story. Comparing the ratios to the level of total employee and employer contributions illustrates the benefit that the contributions are funding. In other words, the higher the ratio, the more “bang for the buck”. As shown below, Oregon PERS has the third highest ratio of the peer group (excluding IAP contributions and benefits). This shows a high efficiency in providing benefits compared to the contributions. Note that neither the replacement ratio nor the total contributions reflect IAP contributions.



## **National Trends**

Keith Brainard, Research Director of NASRA, gave a presentation to the Public Pensions Forum on September 29, 2010 in which he cited the following trends observed by NASRA:

- New tiers for new hires, featuring lower benefit levels
- Growing number of hybrid plans with a modest pension combined with a required defined contribution requirement
- Increasing employee and employer contributions
- Lower cost-of-living adjustments for retired members

In addition, GRS has observed the following trends:

- Lowering of the investment return assumption
- Modification of the asset smoothing methods to handle the 2008 asset losses

Some states, in particular Colorado, South Dakota and Minnesota, have reduced the cost-of-living increases for current retirees. These cases are being challenged in court by retirees and have not yet been decided.

## **Summary of Benchmarking**

- Oregon PERS has been proactive in managing its liabilities and setting up a defined contribution component in its benefit package in the 2003 changes
- The investment assumption of 8% is the prevalent assumption among the peer group but our analysis shows this to be on the high end of the range. We recommend the Board continue its biennial assessment of the investment return assumption
- Oregon PERS is one of the 3 funds in the peer group not using the Entry Age Normal funding method
- Oregon is very well-funded at 86% compared to the peer group but still significantly lower than its funded status in 2007 of 111%
- Oregon PERS is within the mid-range for employer contributions, on the low end for employee contributions and on the low end for maximum COLAs
- The ratio of 30-year career benefits to employer contributions for the full formula benefit portion of Oregon PERS is high, indicating efficiency in providing benefits for the cost