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November 20, 2009

Shortfall Recovery - Actuarial Considerations

Oregon Public Employees Retirement System

Matt Larrabee

September Financial Projections

- Our September presentation included ten-year projection estimates of base contribution rates under three investment return scenarios
  - Base rates exclude the effects of:
    - Side account rate relief
    - Payments for Individual Account Program (IAP), retiree healthcare, and debt service on Pension Obligation Bonds (POBs)
  - Projections were based on July 31, 2009 asset levels
    - Year-to-date investment return through July 31 was +6.26%
    - By comparison, year-to-date return through September 30 was +13.83%

> ***August & September returns increased current asset levels by approximately $2-$2½ billion compared to those modeled as the starting point for our September projections***
>
> ***All else being equal, such an increase in asset levels would increase the estimated year-end 2009 funded status by 3½%-4½%***

September Financial Projections

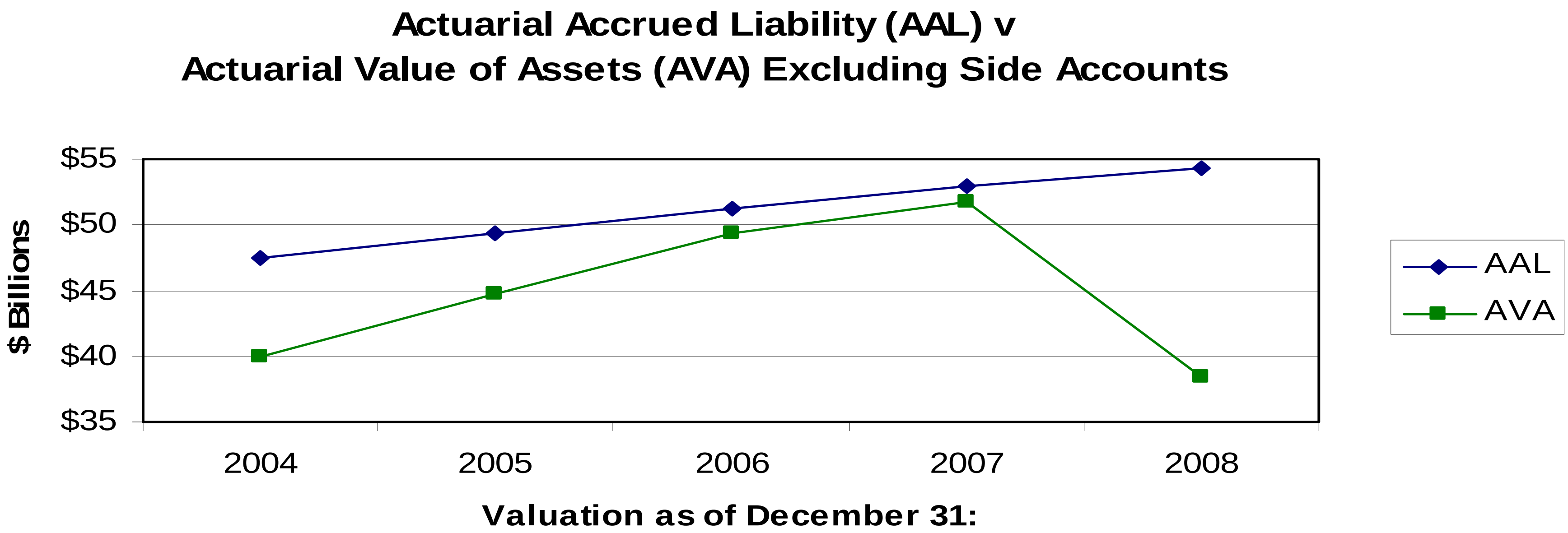
- For reference, the September projections are included in the Appendix
  - In addition, projections of net rates are also included in the Appendix
    - Net rates are base rates with an adjustment for side account rate relief
- Even under the most optimistic scenario modeled in September (10½% annual investment return) base contribution rates increased to 19%-20% of payroll by the end of ten years
- With an 8% annual investment return, base rates increased to 24% of payroll by the end of ten years
- The modeled base contribution rate consists of two parts:
  - Normal Cost Rate
    - Economic value of new benefits during a year
  - Unfunded Actuarial Liability (UAL) Rate
    - Amortization payment of shortfalls for benefits already granted

Usefulness/Limitations of Models

- The recent asset downturn and subsequent partial recovery help to illustrate both the usefulness and limitations of actuarial modeling
- Models are useful because they can provide:
  - Long-term forecasting using "best estimate" assumptions
  - Sensitivity analysis on the effect of a key factor varying from assumption
    - Example: September 2009 Board meeting projections
  - An estimate of the likely range of possible outcomes (with percentiles) for a robust variety of possible future experience
    - Examples: Annual financial modeling presentations to the Board
  - The ability for policymakers and stakeholders to quantify the projected long-term effects of significant recent changes
- Models are limited because:
  - They are not a guarantee of future experience
  - In exceptional situations, actual experience can fall outside of the range of even a robust model

"Computers are useless. They can only give you answers." *-Picasso*

Historical Asset and Liability Levels



- Liability levels have been fairly predictable (2½%-4% annual growth)
  - Rate of liability growth is significantly lower than it was pre-reform
- At year-end 2008, there was a $15.9 billion Unfunded Actuarial Liability shortfall
- As a rough approximation, the recovery through September 30 likely improved funded status to 75% (from 71% at 12/31/08) and lowered the shortfall to $14 billion
- Using an asset restoration approach, there are two ways to make up a shortfall:
  - Contributions
  - Investment returns

UAL Rate and Normal Cost Rate

- Tier 1/Tier 2 shortfalls are amortized over 20 years as a level percent of pay
  - Some systems amortize shortfalls over 30 years
    - A 30-year policy leads to “negative amortization” in the first few years
- System payroll as of December 31, 2008 is $8.1 billion dollars
- What percentage of payroll would be needed to amortize a $15.9 billion shortfall, assuming 3.75% payroll growth and 8% investment returns?

Amortization Period	UAL Rate *(Percent of Payroll)*
20 Years	15%
30 Years	11%
40 Years	10%

- The Normal Cost Rate is also charged in addition to the UAL Rate
  - Blended Tier 1/Tier 2/OPSRP and retiree healthcare Normal Cost Rate as of December 31, 2008 is 7.5% of payroll
  - Normal Cost Rate will increase over time as the system evolves from primarily Money Match to primarily Full Formula/OPSRP
    - Our most recent modeling work indicates 8½%-10% of payroll as an estimate range for the long-term Normal Cost Rate

Current Board Policy

- Current Board policy was first enacted for the December 31, 2004 valuation
- Fair value of assets (also known as market value) is used for rate calculations
- Liabilities are valued using the projected unit credit cost method
- Any Tier 1/Tier 2 shortfalls are amortized over 20 years
- Employer rate changes for each new biennium are restricted to a "rate collar"
  - Rate collaring was developed as a smoothing method that is more transparent and understandable than asset smoothing
  - The rate collar is applied to the base rate (before application of side account rate relief) and is the greater of:
    - 3% of payroll
    - 20% of the rate for the previous biennium
  - If the funded status is below 80% (or above 120%), the collar doubles
    - The "double collar" was included in the policy as recognition that the single collar may not be sufficiently responsive in extreme market conditions
    - The funded status calculation is done without regard to side accounts
      - Side account transfers are used to help pay the base rates calculated excluding side accounts

Historical and Advisory Rates

- Rates below are blended Tier 1/Tier 2/OPSRP & retiree healthcare rates, are before consideration of side account relief, and exclude IAP contributions and debt service payments on Pension Obligation Bonds (POBs)

	Actual 2007-09 *(12/05 Valuation)*	Actual 2009-11 *(12/07 Valuation)*	Advisory 2011-13 Pre-Collar *(12/08 Valuation)*	Advisory 2011-13 Post-Collar *(12/08 Valuation)*
Normal Cost Rate	4.3%	6.2%	7.5%	7.5%
UAL Rate	10.5%	6.2%	15.0%	10.9%
Total Base Rate	14.8%	12.4%	22.5%	18.4%

- For 2011-2013, the doubled rate collar has a near-term effect very similar to that of temporarily extending the UAL Rate amortization period to between 30 and 40 years
- As the Normal Cost Rate increases between now and 2011-2013, the effective UAL Rate being charged will decrease in equal amount
  – The rate collar is on the total base rate, not on its component parts

Policy Assessment Considerations

- Any alternatives to the current policy should be assessed against the objectives stated by the Board:
  – Transparent
  – Predictable and stable rates
  – Protect funded status
  – Equitable across generations
  – Actuarially sound
  – GASB compliant
- When assessing policy, it is also important to consider the effects that side accounts have on changes to net employer rates calculated after application of side account rate relief

Actuarial Certification

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This report material includes or is derived from projections of future funding and/or accounting costs and/or benefit related results**.** To prepare these projections or results, various *actuarial assumptions*, as described in the Appendix, were used to project a limited number of scenarios from a range of possibilities. However, the future is uncertain, and the system's actual experience will likely differ from the assumptions utilized and the scenarios presented; these differences may be significant or material. In addition, different assumptions or scenarios may also be within the reasonable range and results based on those assumptions would be different. This report has been created for a limited purpose, is presented at a particular point in time and should not be viewed as a prediction of the system's future financial condition. To prepare the results shown in this report, various *actuarial methods*, as described in the Appendix, were used.

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Actuarial Certification - Continued

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We are available to answer any questions on the material in this report or to provide explanations or further details as appropriate. The undersigned credentialed actuaries meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained in this report. We are not aware of any direct or material indirect financial interest or relationship, including investments or other services that could create a conflict of interest, that would impair the objectivity of our work.

We are available to answer any questions on the material contained in the report, or to provide explanations or further details as may be appropriate.

November 20, 2009

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Appendix

Ten-Year Financial Projections

Overview

- Basis for modeling
  - 12/31/2007 Tier 1/Tier 2 and OPSRP actuarial valuations
  - Contribution rates and funded status are modeled on a system-wide basis
  - Does not include retiree healthcare or IAP contributions
  - **Based on published investment returns through July 31, 2009**
    - Our financial modeling earlier this year used March 31 asset levels
- Projected effects of 4.5%, 8.0% and 10.5% annual investment returns
  - Represents 10-year earnings average, valuation interest rate and 25-year earnings average, respectively
- Results model the impact of two rate-setting policies
  - Current board policy
    - Rate collared to greater of 3% of payroll or 20% of current rate
    - Width of collar doubles if plan is less than 80% funded
  - Alternative policy
    - Same as above, except that the collar is not allowed to double

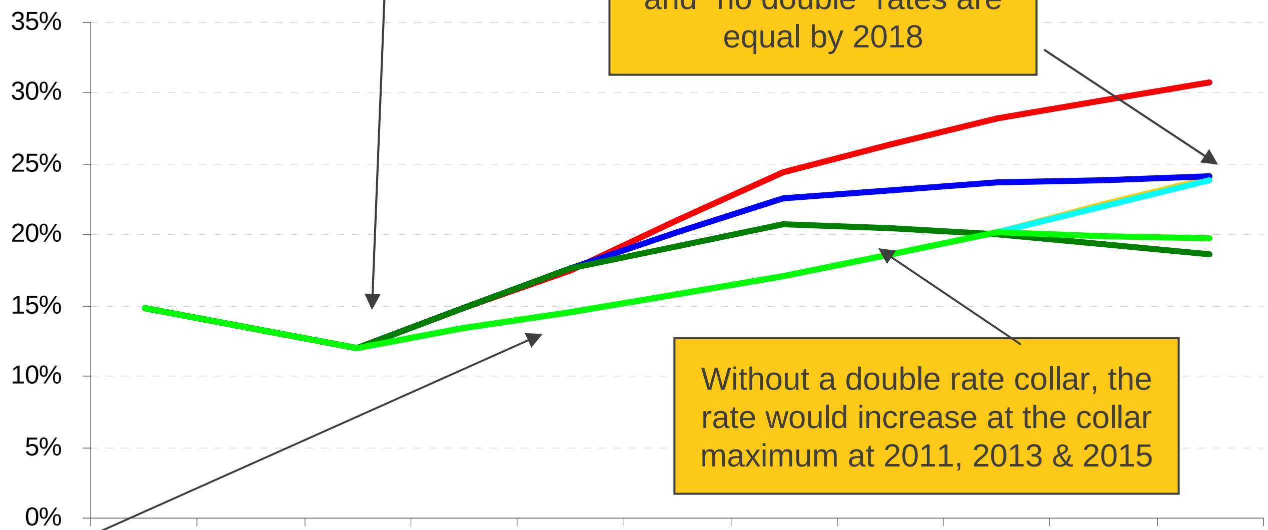
Rates and funded percentages shown are before consideration of side accounts

Ten-Year Financial Projections – Base Rates

Combined Payroll Weighted (Tier 1/Tier 2, OPSRP) Base Contribution Rate (Excludes Side Accounts, Excludes IAP and Retiree Healthcare Rates)

Rates for the 2009-2011 biennium are based on the 12/31/2007 valuation

At 8% return, the “double” and “no double” rates are equal by 2018



The 12/31/2009 valuation will set rates for 2011-2013. The width of the collar will determine rates for that biennium

Without a double rate collar, the rate would increase at the collar maximum at 2011, 2013 & 2015

		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
4.5% w/ Double Collar		15%	13%	12%	15%	18%	21%	24%	26%	28%	30%	31%
4.5% w/o Double Collar		15%	13%	12%	13%	15%	16%	17%	19%	20%	22%	24%
8% w/ Double Collar		15%	13%	12%	15%	18%	20%	23%	23%	24%	24%	24%
8% w/o Double Collar		15%	13%	12%	13%	15%	16%	17%	19%	20%	22%	24%
10.5% w/ Double Collar		15%	13%	12%	15%	18%	19%	21%	20%	20%	19%	19%
10.5% w/o Double Collar		15%	13%	12%	13%	15%	16%	17%	19%	20%	20%	20%

Rates do not include contribution rates for the IAP or Retiree Healthcare Programs, and do not take into account any contributions that might be needed to address a 5-year Rate Guarantee Reserve deficit

Ten-Year Financial Projections – Excluding Side Accounts

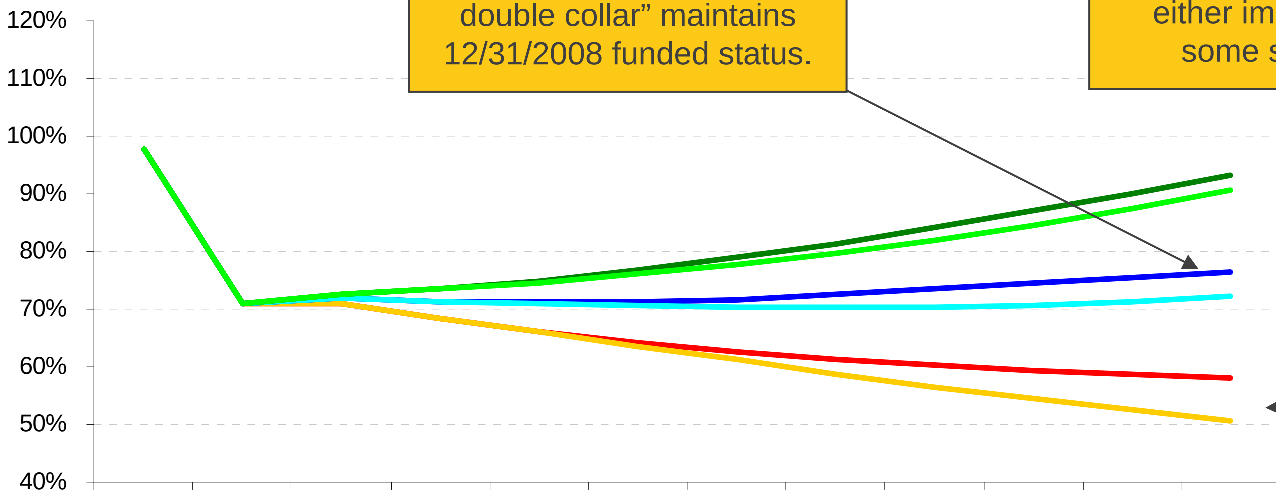
Combined (Tier 1/Tier 2, OPSRP) Valuation Funded Status

Eliminating the double collar lowers the projected 2018 funded status. The decrease is most pronounced in the 4.5% return scenario

Except for the most optimistic scenario, the plan remains below the 80% "double collar" threshold during the entire projection period.

At 8% return, the double collar allows improvement of funded status over the projection period. The "no double collar" maintains 12/31/2008 funded status.

In all scenario/policy combinations except 4.5% return and no double collar, funded status displays either improvement or some stabilization



As of 12/31		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
4.5% w/ Double Collar		98%	71%	71%	69%	66%	64%	63%	61%	60%	59%	59%	58%
4.5% w/o Double Collar		98%	71%	71%	69%	66%	64%	61%	59%	57%	54%	52%	51%
8% w/ Double Collar		98%	71%	72%	71%	71%	71%	72%	73%	73%	74%	75%	77%
8% w/o Double Collar		98%	71%	72%	71%	71%	71%	70%	70%	70%	71%	71%	72%
10.5% w/ Double Collar		98%	71%	72%	73%	75%	77%	79%	81%	84%	87%	90%	93%
10.5% w/o Double Collar		98%	71%	72%	73%	75%	76%	78%	80%	82%	85%	87%	91%

Funded status projections exclude Side Accounts from valuation assets

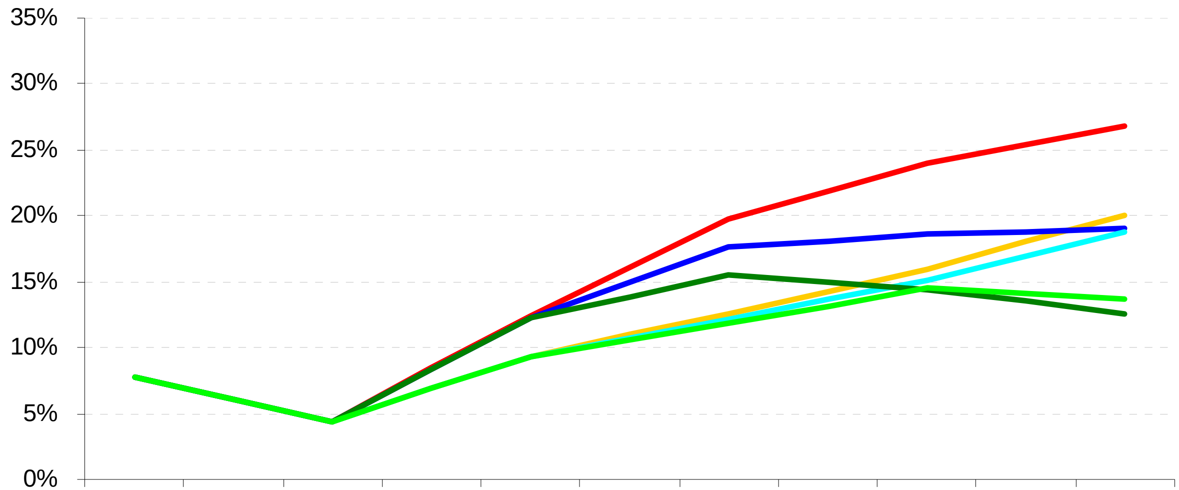
Ten-Year Financial Projections
Observations

- By the end of the ten-year projection period, base rates are at least 19%
- In all scenario/policy combinations except 4.5% return and no double rate collar, the funded status exhibits either improvement or some stabilization over the projection period
- With the current rate collar policy in place, base contribution rates will increase by 6% of payroll for the 2011-2013 biennium in all 3 scenarios
  - The increase will be to the top of the double rate collar
  - Rates for subsequent periods will depend on investment results
- Under a “no double rate collar” policy, base rates for 2011-2017 would increase by the maximum permitted by the collar in all 3 scenarios

Ten-Year Financial Projections – Net Rates

Combined Payroll Weighted (Tier 1&2, OPSRP) Net Contribution Rate

Under the "8% w/ Double Collar" scenario, the net rate increases from 4% in 2009-2011 to 12% in 2011-2013



		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
4.5% w/ Double Collar		8%	6%	4%	8%	12%	16%	20%	22%	24%	25%	27%
4.5% w/o Double Collar		8%	6%	4%	7%	9%	11%	13%	14%	16%	18%	20%
8% w/ Double Collar		8%	6%	4%	8%	12%	15%	18%	18%	19%	19%	19%
8% w/o Double Collar		8%	6%	4%	7%	9%	11%	12%	14%	15%	17%	19%
10.5% w/ Double Collar		8%	6%	4%	8%	12%	14%	15%	15%	14%	14%	13%
10.5% w/o Double Collar		8%	6%	4%	7%	9%	11%	12%	13%	15%	14%	14%

Rates do not include contribution rates for the IAP or Retiree Healthcare Programs, and do not take into account any contributions that might be needed to address a 5-year Rate Guarantee Reserve Deficit

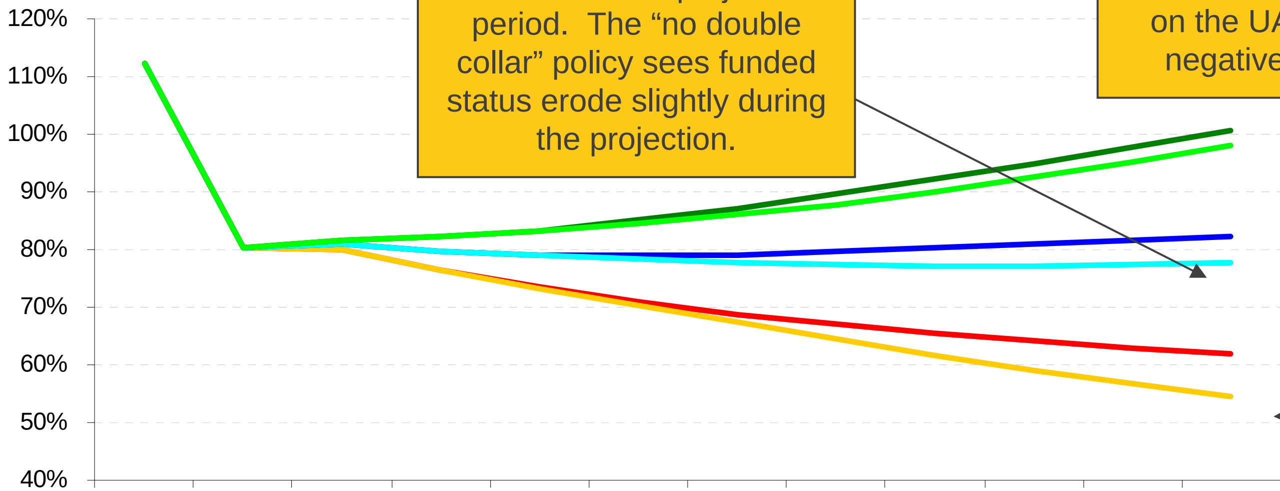
Ten-Year Financial Projections – Including Side Accounts

Combined (Tier 1&2, OPSRP) Pension Funded Status

Eliminating the double collar lowers the projected 2018 funded status. The decrease is most pronounced in the 4.5% return scenario

At 8% return, the double collar reflects some improvement of funded status over the projection period. The “no double collar” policy sees funded status erode slightly during the projection.

In the downside scenario, the maximum allowed UAL payment in 2018 is not sufficient to cover interest on the UAL, resulting in negative amortization



As of 12/31		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
4.5% w/ Double Collar		112%	80%	80%	77%	74%	71%	69%	67%	65%	64%	63%	62%
4.5% w/o Double Collar		112%	80%	80%	77%	73%	70%	67%	64%	62%	59%	57%	54%
8% w/ Double Collar		112%	80%	81%	80%	79%	79%	79%	80%	80%	81%	82%	82%
8% w/o Double Collar		112%	80%	81%	80%	79%	78%	78%	77%	77%	77%	77%	78%
10.5% w/ Double Collar		112%	80%	82%	82%	83%	85%	87%	90%	92%	95%	98%	101%
10.5% w/o Double Collar		112%	80%	82%	82%	83%	84%	86%	88%	90%	93%	95%	98%

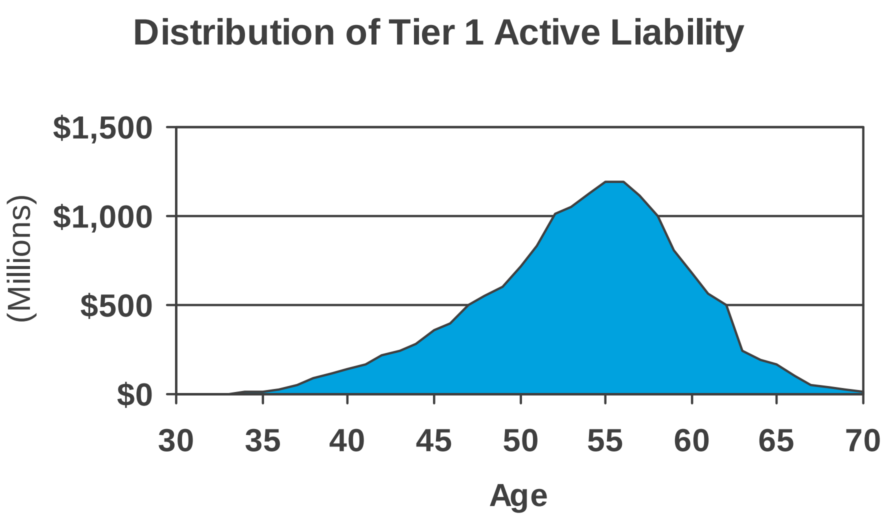
Impact of Collar/Side Account on Sample Employer

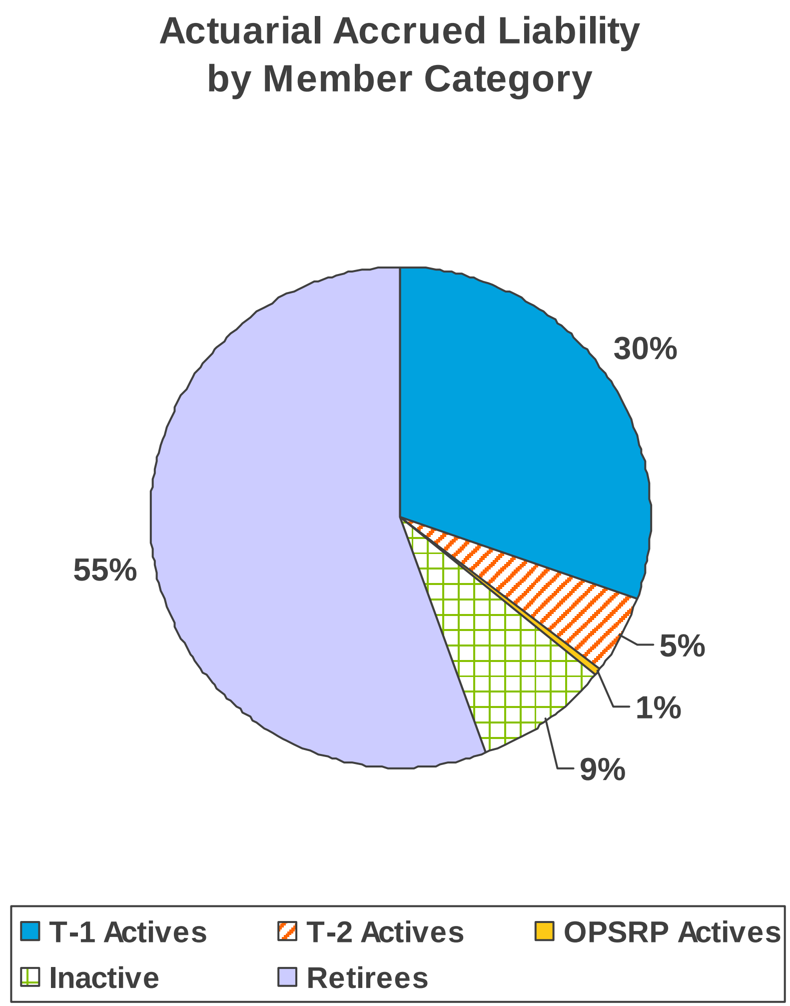
- Sample employer contribution rates based on the 2007 valuation:
  - Base contribution rate: 14.01% of payroll
  - Side account rate relief: 13.81% of payroll
  - Net pension contribution rate: **0.20% of payroll**
- 2008 valuation results:
  - Funded status drops below 80%
  - Rates are limited by the doubled rate collar
  - Side account relief drops over 400 basis points due to asset losses
    - Base contribution rate: 20.01% of payroll
    - Side account rate relief: 9.40% of payroll
    - Net pension contribution rate: **10.61% of payroll**
  - Retiree healthcare rates and OPSRP UAL rates are paid in addition to the net pension contribution rate

The increase in the net contribution rate for a side account employer can be greater than the width of the double rate collar

12/31/2008 Tier 1/Tier 2 & OPSRP Valuation
Actuarial Accrued Liabilities

- While Tier 1 members represent the predominant portion of the active liability, 64% of the System's total accrued liability is for members who are no longer actively working in covered employment.
- Over 48% of the Tier 1 active liability is for members over age 55, and approximately 77% of the Tier 1 active liability is for members over age 50.





Appendix
Actuarial Basis

Data

We have based our ten-year financial projection of the liabilities on the data, methods, assumptions and plan provisions described in the December 31, 2007, Actuarial Valuation (“2007 Valuation Report”) for the Oregon Public Employees Retirement System.

Assets as of December 31, 2008, were based on values provided by Oregon PERS reflecting the Board’s earnings crediting decisions for 2008. Assets and year-to-date returns as of July 31, 2009 and September 30, 2009 are as published by the Oregon Investment Council (OIC).

As the starting point for the ten-year financial projections, assets were updated based on year-to-date investment results through July 31, 2009 as published by the Oregon Investment Council (OIC). Year-to-date 2009 returns as of that date on regular accounts are +6.26%.

We have assumed that the active participant data reflected in the valuation of the Plan remains stable over the projection period (i.e. – participants leaving employment are replaced by new hires in such a way that the total counts, average age, and average service remain stable from year to year). No new members are assumed to be eligible for Tier 1 and Tier 2 benefits; all new entrants are assumed to become members under the OPSRP benefit formula.

December 31, 2008 liabilities and associated normal cost rates in slides 4-7 are based on our December 31, 2008 Actuarial Valuation (“2008 Valuation Report”) for the Oregon Public Employees Retirement System.

Methods / Policies

Liabilities are based on the Projected Unit Credit method and are rolled forward according to the following rules:

Normal cost: Normal cost increases with assumed wage growth adjusted for wage experience, demographic experience and asset return experience (if applicable). Demographic experience follows assumptions described in the Valuation Report.

Accrued liability: Liabilities increase with normal cost and decrease with benefit payments. Results are adjusted for wage, demographic and asset experience (if applicable).

Contribution Rates: The projected contribution rates are calculated on each odd valuation date in accordance with methodologies described in the 2007 and 2008 Valuation Reports. Rates are applied 18 months after the biennial determination date.

Expenses: Administration expenses for ten-year financial projections were assumed to be equal to $8.5M plus .05% of Market Value of Assets.

Actuarial Value of Assets: Equal to Market Value of Assets excluding Contingency, Capital Preservation and Tier 1 Rate Guarantee Reserves

Appendix
Actuarial Basis

Assumptions

In general, assumptions for ten-year financial projections are as described in the 2007 Valuation Report. The December 31, 2008 liabilities and normal costs shown in slides 4-7 are based on assumptions as described in the 2008 Valuation Report.

The major assumptions used in our ten-year financial projections are shown below. They are aggregate average assumptions that apply to the whole population and were held constant throughout the projection period. The economic experience adjustments were allowed to vary in future years given the conditions defined in each economic scenario.

- Valuation interest rate — 8.00%
- General Accounts Growth — 8.00%
- Variable Account Growth — 8.50%
- Wage growth assumption — 3.75%
- Wage growth experience — inflation + 1.25%
- Demographic experience — reflects decrement assumptions as described in the 2007 Valuation Report.

Reserve Projections

Contingency Reserve as of 12/31/2008 was estimated to be $653.2M. No future increases or decreases from this reserve were assumed.

Capital Preservation Reserve was assumed to be $0 throughout the projection period.

Tier 1 Rate Guarantee Reserve (“T1RGR”) was estimated to be a deficit of $0.99B as of 12/31/2008. The reserve was assumed to grow with returns in excess of 8% on Tier 1 Member Accounts plus T1RGR. When aggregate returns were below 8%, applicable amounts from the T1RGR were transferred to the Tier 1 Member Accounts to maintain the 8% target growth on the member accounts. No contributions were allocated to the T1 RGR and the 5-year call on a deficit was not modeled.

Provisions

Provisions valued are as detailed in the 2007 Valuation Report and 2008 Valuation Report.

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