

## Summary of Actuarial Assumptions and Methods

### *I. Valuation Date*

The valuation date is June 30th of each plan year. This is the date as of which the actuarial present value of future benefits and the actuarial value of assets are determined.

### *II. Actuarial Cost Method*

Because the employer contribution rate is set by statute, the actuarial valuation is used to determine the funding period--the number of years required to amortize the Unfunded Actuarial Accrued Liability (UAAL). It is also used to calculate the Annual Required Contribution (ARC) as defined by GASB 25.

The actuarial valuation uses the Entry Age actuarial cost method. Under this method, a normal cost rate is first determined. This is the contribution rate (level as a percentage of pay) required to provide the benefits of the average new member. The normal cost rate consists of two pieces: (i) the member's own contribution rate, and (ii) a portion of the employer contribution rate. This second piece is called the employer normal cost rate.

The total normal cost is determined by dividing the present value of future benefits for a hypothetical group of new members by the present value of their future pay. In calculating the benefits for this group, all changes in provisions or member contribution rates scheduled to occur in the future are assumed to already be in effect. The hypothetical group of new entrants was reset in the 2005 experience study, based on actual new members joining during FY 2001 through FY 2005.

Next, the UAAL is determined. This is the liability for future benefits which is in excess of (i) the actuarial value of assets, and (ii) the present value of future normal costs. The employer contribution that is not used for the employer normal cost is applied to amortize the UAAL.

The funding period is calculated as the number of years required to fully amortize the UAAL, assuming that the System's payroll increases at the payroll growth rate and the State's contribution increases at the State's revenue growth rate. Both employer and member contributions are assumed to be made monthly.

The Entry Age actuarial cost method is an "immediate gain" method (i.e., experience gains and losses are separately identified as part of the UAAL). However, they are amortized over the same period applied to all other components of the UAAL.

The actuarial valuation also determines the GASB Annual Required Contribution (ARC). This is the contribution required to pay the normal cost and amortize the UAAL over 30 years as a level percent of pay. The 30-year period applies to all components of the UAAL and is recalculated each year (open amortization method).

III. Actuarial Value of Assets

The actuarial value of assets is equal to the market value, adjusted for a five-year phase in of actual investment return in excess of expected investment return. The actual return is calculated net of investment and administrative expenses, and the expected investment return is equal to the assumed investment return rate multiplied by the prior year's market value of assets, adjusted for contributions, benefits paid, and refunds.

IV. Actuarial Assumptions

A. Economic Assumptions

1. Investment return: 8% per year, compounded annually, composed of an assumed 3.00% inflation rate and a 5.00% net real rate of return.
2. Salary increase rate: A merit/promotional component dependent on service, plus a 3% inflation component, plus a 1.25% productivity increase, as follows:

<u>Years of Service</u>	<u>Merit/ Promotional Component</u>	<u>Total Salary Increase Rate</u>
(1)	(2)	(3)
0	1.75%	6.00%
1	1.50%	5.75
2	1.00%	5.25
3	1.00%	5.25
4	1.00%	5.25
5	0.75%	5.00
6	0.50%	4.75
7	0.50%	4.75
8	0.50%	4.75
9	0.50%	4.75
10	0.25%	4.50
11	0.25%	4.50
12	0.25%	4.50
13	0.25%	4.50
14	0.25%	4.50
15 or more	0.00%	4.25

3. Payroll growth rate: In the amortization of the unfunded actuarial accrued liability, payroll is assumed to increase 3.5% per year. This increase rate has no allowance for future membership growth.

4. State revenue growth rate: In determining the funding period, the state's sales and income tax revenues are anticipated to grow at 3.5% per year.
5. Future ad hoc cost-of-living increases: 1.0% per year

B. Demographic Assumptions

1. Mortality rates - after retirement or termination.
  - a. Healthy males - 1994 Unisex Pension Mortality Table for males, set back one year.
  - b. Healthy females - 1994 Unisex Pension Mortality Table for females, set back one year.
  - c. Disabled males - PBGC Table Va for disabled males eligible for Social Security disability benefits weighted by 80%.
  - d. Disabled females - PBGC Table VIa for disabled females eligible for Social Security disability benefits.

Sample rates are shown below:

Age	Expected Deaths per 100 Lives			
	Healthy Males	Healthy Females	Disabled Males	Disabled Females
(1)	(2)	(3)	(4)	(4)
40	0.11	0.07	2.26	2.09
45	0.16	0.10	2.58	2.24
50	0.25	0.14	3.06	2.57
55	0.43	0.22	3.86	2.95
60	0.76	0.42	4.82	3.31
65	1.39	0.82	5.42	3.70
70	2.34	1.37	5.91	4.11
75	3.66	2.19	6.74	4.92
80	6.01	3.80	9.02	7.46

2. Mortality rates - active members - Based on 1989 Experience Study, males and females separate. Sample rates are shown below:

Age	Expected Deaths per 100 Lives	
	Male Members	Female Members
(1)	(2)	(3)
25	.04	.02
30	.06	.04
35	.08	.06
40	.11	.08
45	.16	.11
50	.23	.16
55	.32	.23
60	.43	.32
65	.59	.43

3. Disability rates - Based on 2005 Experience Study, males and females separate. Sample rates are shown below:

Age	Expected Disabilities Occurring per 100 Lives	
	Male Members	Female Members
(1)	(2)	(3)
25	.025	.025
30	.025	.025
35	.035	.050
40	.065	.125
45	.100	.200
50	.300	.300
55	.450	.420
60	.175	.420
65	.000	.000

Disability rates are applied only for members with 10 or more years of service, since rates were developed based on exposure for this group.

4. Termination Rates - Separate male and female rates, based on both age and service, developed from the 2005 Experience Study. Rates reflect terminations for causes other than death, disability or retirement. Sample rates are shown below:

a. During the first ten years of Credited Service:

Expected Terminations per 100 Lives		
Credited Service (Years)	Males	Females
(1)	(2)	(3)
0	34.00	24.00
1	19.00	16.00
2	14.00	12.25
3	11.50	10.50
4	9.50	9.00
5	7.75	7.75
6	6.75	6.75
7	6.00	6.00
8	5.50	5.00
9	5.00	4.00

b. With 10 or More Years of Credited Service:

Expected Terminations per 100 Lives		
Age	Males	Females
(1)	(2)	(3)
25	4.74	7.01
30	4.10	5.09
35	3.51	3.66
40	2.97	2.74
45	2.51	2.34
50	2.09	2.08
55	1.66	1.63
60	1.32	1.14
65	1.28	0.82

Termination rates are not applied to a member who is eligible for a retirement benefit (reduced or unreduced).

5. Retirement rates - Separate male and female rates, based on age, developed from the 2005 Experience Study. Sample rates are shown below:

Age	Expected Retirements per 100 Lives			
	Unreduced Retirement		Reduced Retirement	
	Male	Female	Male	Female
49	00	00	0	0
50	20	20	0	0
51	20	20	0	0
52	20	20	0	0
53	20	20	0	0
54	15	20	0	0
55	15	20	1	2
56	15	20	1	2
57	15	20	2	2
58	15	20	2	2
59	15	20	3	2
60	15	20	4	5
61	15	20	4	5
62	25	30		
63	20	25		
64	20	20		
65	30	40		
66	25	25		
67	25	25		
68	20	20		
69	20	20		
70	100	100		

C. Other Assumptions

1. Percent married: 80% of employees are assumed to be married.
2. Age difference: Male members are assumed to be three years older than their spouses, and female members are assumed to be three years younger than their spouses.
3. Percent electing annuity on death (when eligible): All of the spouses of married participants who die after becoming eligible for a retirement benefit are assumed to elect an annuity, in lieu of the \$18,000 lump sum and refund.

4. Percent electing deferred termination benefit: vested terminating members are assumed to elect a refund or a deferred benefit, whichever is more valuable at the time of termination.
5. Assumed age for commencement of deferred benefits: Members electing to receive a deferred benefit are assumed to commence receipt at age 62.
6. Administrative expenses: The assumed investment return rate represents the anticipated net return after payment of all investment and administrative expenses.
7. Supplemental medical insurance: All members, whether currently active, inactive, or retired, are assumed to be eligible to receive the supplemental insurance benefit, if they have at least 10 years of service credit at retirement.
8. Members who retire with at least 24 years of credited service are assumed to have 120 days of unused sick leave for which they will receive one year of service credit. This assumption only applies to reduced and unreduced retirement.
9. No assumption was made that current active members employed by the comprehensive universities will elect to transfer out of OTRS.
10. Reemployment, purchase of service, transfers: No recognition is made of (i) future member reimbursements upon reemployment, (ii) future purchase of additional service, or (iii) special transfer provisions.

V. Participant Data

Participant data was supplied on an electronic file for (i) active members, (ii) inactive vested members who are entitled to a future deferred benefit, (iii) inactive nonvested members who are entitled to a refund of their employee contributions, and in some cases a portion of the accumulated interest, and (iv) members and beneficiaries receiving benefits.

The data for active and inactive, non-retired members included birthdate, sex, years of service, a classified/non-classified status code, salary, employee contributions and accumulated interest on employee contributions. The data also included a code to indicate whether the employee had elected to make contributions on salary above \$25,000, and a code indicating the type of employer (comprehensive university, other college or university, or other employer). For retired members and beneficiaries, the data included date of birth, sex, spouse's date of birth (where applicable), amount of monthly benefit, date of retirement, and a form of payment code.

Salary supplied for the current year was based on the earnings for the October preceding the valuation date. This salary was adjusted by the salary increase rate for one year, and limited by the maximum pay where appropriate.

Assumptions were made to correct for missing, bad, or inconsistent data. These had no material impact on the results presented.

Some inactive, nonvested employees who are entitled to a refund are not included in the data, but a liability for their refund is included instead in the Suspense Fund, which is included in the liability.

VI. Dates of Adoption of Assumptions and Methods

Generally, actuarial assumptions and methods were developed from the 2005 experience study, and were adopted by the Board of Trustees in August 2005 and first reflected in the June 30, 2005 actuarial valuation. The adopted assumptions were recommended by the actuary. Some assumptions were left unchanged from the prior experience study in 1999, including female mortality for disabled retirees, the investment return rate, and active member mortality for males and females.

Since the June 30, 2004 valuation, there is an assumption that future ad hoc cost-of-living increases would be granted from time to time, without additional funding, and these would average 1.00% per year.

## Addendum to June 30, 2005 Actuarial Valuation

### Certification

We have prepared an actuarial valuation of the Oklahoma Teachers' Retirement System as of June 30, 2004, for the plan year ending June 30, 2005. The results of the valuation are set forth in this report, which reflects the provisions of the System as amended and effective on July 1, 2004.

The valuation is based on employee and financial data which were provided by the Oklahoma Teachers' Retirement System and the independent auditor, respectively, and which are summarized in this report.

The results in this Addendum have been prepared for the sole purpose of meeting the Retirement Board's requirement to submit this information to the Oklahoma State Pension Commission, based on the following prescribed assumptions (70 O.S. 2001, Section 17-106.1, Section H):

Interest rate: 7.5%

COLA assumption: 2.0%

Mortality: RP 2000 Generational Mortality Tables (active members, healthy annuitants, and disabled annuitants)

Amortization period: 30 years, open period

Sources of all contributions and revenues, including dedicated tax fee revenue and federal monies

All other assumptions, methodologies, and plan provisions used are consistent with those used in the June 30, 2005 valuation.

The results shown in this Addendum are not consistent with those in the June 30, 2005 valuation. The June 30, 2005 valuation results were determined in accordance with generally accepted actuarial principles and procedures, and are in compliance with the Actuarial Standards of Board Actuarial Standard of Practice No. 27-Selection of Economic Assumptions for Measuring Pension Obligations. The results shown in this Addendum are not based on the assumptions and methodologies adopted by the Retirement Board. For those results, see the June 30, 2005 actuarial valuation.

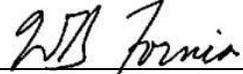
We are available to answer any questions on the material contained in the report, or to provide explanations or further details as may be appropriate.

  
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J. Christian Conradi, ASA, MAAA, EA

October 26, 2005

  
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October 26, 2005

  
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October 26, 2005

**Summary of Valuation Results Under Prescribed Assumptions**

This supplemental report has been prepared by Gabriel, Roeder, Smith & Company for the Oklahoma Teachers' Retirement System to present the results of a valuation of the Oklahoma Teachers' Retirement System as of June 30, 2005, based on the prescribed assumptions under 70 O.S. 2001, Section 17-106.1, Section H of current State Statutes and regulations issued thereunder.

A summary of principal valuation results from the current valuation and the prior valuation.

	Actuarial Valuation as of		Change Between Years	
	June 30, 2005	June 30, 2004	Amount	Percent
<b>Summary of Costs</b>				
Required State Contribution for Current Year under Prescribed Assumptions	\$730,904,901	\$717,349,127	\$13,555,774	1.89%
Actual State Contribution Received in Prior Year	\$163,919,337	\$143,100,533	\$20,818,804	14.55%
<b>Funded Status</b>				
Actuarial Accrued Liability	\$16,144,811,021	\$15,861,120,669	\$283,690,352	1.79%
Actuarial Value of Assets	\$6,952,687,592	\$6,660,918,318	\$291,769,274	4.38%
Unfunded Actuarial Accrued Liability	\$9,192,123,429	\$9,200,202,351	-\$8,078,922	-0.09%
<b>Market Value of Assets and Additional Liabilities</b>				
Market Value of Assets	\$7,238,087,324	\$6,666,489,439	\$571,597,885	8.57%
Present Value of Projected System Benefits	\$19,491,327,483	\$19,158,355,942	\$332,971,541	1.74%

Summary of Contribution Requirements	Actuarial Valuation as of				% of Change
	June 30, 2005		June 30, 2004		
	Amount	% of Active Covered Comp	Amount	% of Active Covered Comp	
1. Payroll					
a. Supplied by system	\$3,175,161,612		\$3,030,749,000		4.76%
b. Adjusted for 1-year's pay increase	\$3,323,397,002		\$3,163,354,010		5.06%
c. Adjusted for 1-year's pay increase with pay caps	\$3,279,424,196		\$3,110,720,010		5.42%
2. Total Normal Cost Mid-Year	\$419,498,676	12.79%	\$414,036,833	13.31%	1.32%
3. Unfunded Actuarial Accrued Liability	\$9,192,123,429		\$9,200,202,351		-0.09%
4. Amortization of Unfunded Actuarial Accrued Liability over 30 years from July 1, 2005	\$788,020,125	24.03%	\$753,431,456	24.22%	4.59%
5. Total Required Contribution under Prescribed Assumptions (2+4)	\$1,207,518,801	36.82%	\$1,167,468,289	37.53%	3.43%
6. Estimated Employee Contribution (7% x 1c)	\$229,559,694	7.00%	\$217,750,401	7.00%	5.42%
7. Estimated local employer and Federal contributions					
a. Local employers (7.05%)	\$231,199,406	7.05%	\$219,305,761	7.05%	5.42%
b. Federal	\$15,854,800	0.48%	\$13,063,000	0.42%	21.37%
c. Total	\$247,054,206	7.53%	\$232,368,761	7.47%	6.32%
8. Required State Contribution to amortize Unfunded Actuarial Accrued Liability over 30 years from July 1, 2005 (5 - 6 - 7c)	\$730,904,901	22.29%	\$717,349,127	23.06%	1.89%
9. Previous year's actual State Contribution	\$163,919,337	5.27%	\$143,100,533	4.58%	14.55%
10. Funding period	Not Sufficient to Amortize UAAL		Not Sufficient to Amortize UAAL		N/A

### Unfunded Actuarial Accrued Liability

The actuarial accrued liability is the present value of projected system benefits allocated to past service by the actuarial funding method being used.

	Total System	
	June 30, 2005	June 30, 2004
1. Actuarial Present Value of Benefits		
a. Active members	\$ 11,286,997,374	\$ 11,315,970,003
b. Inactives	346,072,986	303,852,234
c. Retirees and beneficiaries	7,858,257,123	7,538,533,705
d. Total	19,491,327,483	19,158,355,942
2. Actuarial Present Value of Future Normal Costs	\$ 3,346,516,462	\$ 3,297,235,273
3. Total Actuarial Accrued Liability (1d - 2)	\$ 16,144,811,021	\$ 15,861,120,669
4. Actuarial Value of Assets	\$ 6,952,687,592	\$ 6,660,918,318
<b>5. Unfunded Actuarial Accrued Liability (3-4, not less than \$0)</b>	<b>\$ 9,192,123,429</b>	<b>\$ 9,200,202,351</b>

### Normal Cost

The components of normal cost under the System's funding method are:

Component	June 30, 2005	June 30, 2004
Retirement Benefits	\$ 317,300,185	\$ 319,470,945
Withdrawal Benefits	47,527,179	37,328,640
Active Death Benefits	7,272,970	4,666,080
Refunds	21,974,013	25,818,976
Supplemental Medical Insurance	10,168,539	11,509,664
Post Retirement Death Benefits	1,534,280	1,555,360
Disability Benefits	13,721,510	13,687,168
<b>Total Normal Cost (Mid-year)</b>	<b>\$ 419,498,676</b>	<b>\$ 414,036,833</b>
Annual Covered Payroll (with pay caps)	\$ 3,279,424,196	\$ 3,110,720,010
Normal Cost Rate At Mid-year	12.79%	13.31%

**Actuarial Assumptions**

This section presents and describes the actuarial assumptions used for this supplemental valuation. The census of members, market and actuarial value of assets, actuarial basis and provisions of the Plan are the same as described elsewhere in this valuation report. The valuation is based on the premise that the Plan will continue in existence.

**Economic Assumptions**

1. Investment Return (Prescribed) 7.5%, net of investment and administrative expenses, per annum, compound annually.
2. Earnings Progression Sample rates below:

<u>Years of Service</u>	<u>Merit/ Promotional Component</u>	<u>Total Salary Increase Rate</u>
(1)	(2)	(3)
0	1.75%	6.00%
1	1.50%	5.75
2	1.00%	5.25
3	1.00%	5.25
4	1.00%	5.25
5	0.75%	5.00
6	0.50%	4.75
7	0.50%	4.75
8	0.50%	4.75
9	0.50%	4.75
10	0.25%	4.50
11	0.25%	4.50
12	0.25%	4.50
13	0.25%	4.50
14	0.25%	4.50
15 or more	0.00%	4.25

3. Payroll growth rate: In the amortization of the unfunded actuarial accrued liability, payroll is assumed to increase 3.5% per year. This increase rate has no allowance for future membership growth.
4. State revenue growth rate: In determining the funding period, the state's sales and income tax revenues are anticipated to grow at 3.5% per year.
5. Future ad hoc cost-of-living increases: We assume that in future years, cost-of-living increases will be granted that will average 2% per year.

**Demographic Assumptions**

1. Retirement rate - Sample rates are shown below:

Age	Expected Retirements per 100 Lives			
	Unreduced Retirement		Reduced Retirement	
	Male	Female	Male	Female
49	00	00	0	0
50	20	20	0	0
51	20	20	0	0
52	20	20	0	0
53	20	20	0	0
54	15	20	0	0
55	15	20	1	2
56	15	20	1	2
57	15	20	2	2
58	15	20	2	2
59	15	20	3	2
60	15	20	4	5
61	15	20	4	5
62	25	30		
63	20	25		
64	20	20		
65	30	40		
66	25	25		
67	25	25		
68	20	20		
69	20	20		
70	100	100		

2. Mortality rates - Active members – RP-2000 Generational Mortality Tables for active employees, males and females separate, projected with Scale AA.

Retirees (non-disabled) and beneficiaries – RP-2000 Generational Mortality Tables for healthy annuitants, males and females separate, projected with Scale AA.

Disabled retirees – RP-2000 Generational Mortality Tables for disabled annuitants, males and females separate, projected with Scale AA

3. Disability rates - Sample rates are shown below:

Age	Expected Disabilities Occurring per 100 Lives	
	Male Members	Female Members
(1)	(2)	(3)
25	.025	.025
30	.025	.025
35	.035	.050
40	.065	.125
45	.100	.200
50	.300	.300
55	.450	.420
60	.175	.420
65	.000	.000

Disability rates are applied only for members with 10 or more years of service, since rates were developed based on exposure for this group.

4. Withdrawal Rates - Sample rates are shown below:

During the first ten years of Credited Service:

Credited Service (Years)	Expected Terminations per 100 Lives	
	Males	Females
(1)	(2)	(3)
0	34.00	24.00
1	19.00	16.00
2	14.00	12.25
3	11.50	10.50
4	9.50	9.00
5	7.75	7.75
6	6.75	6.75
7	6.00	6.00
8	5.50	5.00
9	5.00	4.00

With 10 or More Years of Credited Service:

Expected Terminations per 100 Lives		
Age	Males	Females
(1)	(2)	(3)
25	4.74	7.01
30	4.10	5.09
35	3.51	3.66
40	2.97	2.74
45	2.51	2.34
50	2.09	2.08
55	1.66	1.63
60	1.32	1.14
65	1.28	0.82

Termination rates are not applied to a member who is eligible for a retirement benefit (reduced or unreduced).

5. Marital Status – Percentage married: 80% of employees are assumed to be married.  
 Age Difference: Males are assumed to be three (3) years older than females.

### Other Assumptions

1. Percent married: 80% of employees are assumed to be married.
2. Age difference: Male members are assumed to be three years older than their spouses, and female members are assumed to be three years younger than their spouses.
3. Percent electing annuity on death (when eligible): All of the spouses of married participants who die after becoming eligible for a retirement benefit are assumed to elect an annuity, in lieu of the \$18,000 lump sum and refund.
4. Percent electing deferred termination benefit: vested terminating members are assumed to elect a refund or a deferred benefit, whichever is more valuable at the time of termination.
5. Assumed age for commencement of deferred benefits: Members electing to receive a deferred benefit are assumed to commence receipt at age 62.
6. Administrative expenses: The assumed investment return rate represents the anticipated net return after payment of all investment and administrative expenses.
7. Supplemental medical insurance: All members, whether currently active, inactive, or retired, are assumed to be eligible to receive the supplemental insurance benefit, if they have at least 10 years of service credit at retirement.
8. Members who retire with at least 24 years credit are assumed to have 120 days of unused sick leave for which they will receive one year of service credit. This assumption only applies to reduced and unreduced retirement.
9. No assumption was made that current active members employed by the comprehensive universities will elect to transfer out of OTRS.
10. Reemployment, purchase of service, transfers: No recognition is made of (i) future member reimbursements upon reemployment, (ii) future purchase of additional service, or (iii) special transfer provisions.