

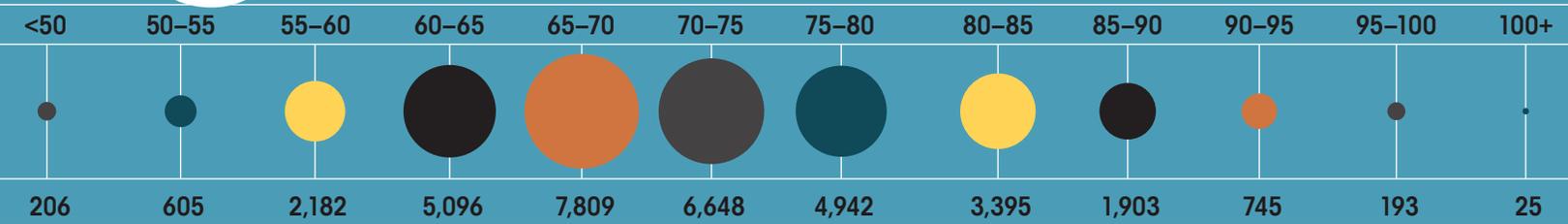
TOTAL
 RETIRED MEMBERS
33,749

ACTUARIAL

6

OPERS

RETIRED MEMBERS PER AGE GROUP



AVERAGE ANNUAL BENEFIT 2006-2016



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November 3, 2016

Board of Trustees
Oklahoma Public Employees Retirement System
5801 N. Broadway Extension, Suite 400
P.O. Box 53007
Oklahoma City, OK 73152-3007

Members of the Board:

We have completed an actuarial valuation of the Oklahoma Public Employees Retirement System as of July 1, 2016 for the purpose of determining the actuarial contribution rate and calculating and analyzing key financial measurements. Actuarial valuations are performed annually. This valuation reflects the benefit provisions and contribution rates in effect as of July 1, 2016.

In preparing the valuation, we, as the actuary, relied on the data provided by the System. As part of our work, we performed a limited review of the data for consistency and reasonableness and did not find material defects in the data.

All of the information and supporting schedules in the Actuarial Section have been provided by Cavanaugh Macdonald Consulting, LLC. We also prepared the *Schedule of Changes in the Net Pension Liability* and *Schedule of Employer Contributions* shown in the financial section of the Comprehensive Annual Financial Report. All historical information that references a valuation date prior to July 1, 2010 was prepared by the prior actuarial firm.

The assumptions recommended by the actuary and adopted by the Board are, in the aggregate, reasonably related to the experience under the System and to reasonable expectations of anticipated experience under the System and meet the parameters for the disclosures under statements issued by the Governmental Accounting Standards Board.

Future actuarial results may differ significantly from the current results presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period

or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law. Since the potential impact of such factors is outside the scope of a normal annual actuarial valuation, an analysis of the range of results is not presented herein.

The actuary prepared the following supporting schedules for the Comprehensive Annual Financial Report:

Actuarial Section

- Summary of Results
- Analysis of Financial Experience
- Solvency Test
- Summary of Membership Data

This is to certify that the independent consulting actuaries, Alisa Bennett and Brent Banister, are Members of the American Academy of Actuaries and meet the qualification standards of the American Academy of Actuaries to render the actuarial opinion contained herein. They have experience in performing valuations for public retirement systems. The valuation was prepared in accordance with Actuarial Standards of Practice issued by the Actuarial Standards Board. The actuarial calculations were performed by qualified actuaries in accordance with accepted actuarial procedures, based on the current provisions of the retirement system and on actuarial assumptions that are internally consistent and reasonably based on the actual experience of the System.

Respectfully submitted,



Alisa Bennett, FSA, EA, FCA, MAAA
Principal and Consulting Actuary



Brent Banister, PhD, FSA, EA, FCA, MAAA
Chief Pension Actuary

Summary of Results

	7/1/2016 Valuation	7/1/2015 Valuation	% Change
1. PARTICIPANT DATA			
Number of:			
Active Members	41,806	43,843	(4.6)
Retired and Disabled Members and Beneficiaries	33,749	32,754	3.0
Inactive Members	5,946	5,863	1.4
Total Members	81,501	82,460	(1.2)
Projected Annual Salaries of Active Members	\$ 1,790,809,603	\$ 1,808,972,785	(1.0)
Annual Retirement Payments for Retired Members and Beneficiaries	\$ 553,631,087	\$ 528,779,908	4.7
2. ASSETS AND LIABILITIES			
Total Actuarial Accrued Liability	\$ 9,427,809,623	\$ 8,996,125,901	4.8
Market Value of Assets	\$ 8,435,578,907	\$ 8,636,441,984	(2.3)
Actuarial Value of Assets	\$ 8,790,886,036	\$ 8,420,306,645	4.4
Unfunded Actuarial Accrued Liability	\$ 636,923,587	\$ 575,819,256	10.6
Funded Ratio	93.2%	93.6%	(0.4)
3. EMPLOYER CONTRIBUTION RATES AS A PERCENT OF PAYROLL			
Normal Cost Rate	10.01%	9.52%	
Amortization of Unfunded Actuarial Accrued Liability	3.79%	3.28%	
Budgeted Expenses	0.37%	0.37%	
Total Actuarially Determined Contribution Rate	14.17%	13.17%	
Less Estimated Member Contribution Rate	4.10%	4.07%	
Employer Actuarially Determined Contribution Rate	10.07%	9.10%	
Less Statutory State Employer Contribution Rate	16.50%	16.50%	
Contribution Shortfall/(Surplus)	(6.43%)	(7.40%)	

Analysis of Financial Experience

Gains & Losses in Actuarial Accrued Liability During the Year Ended June 30, 2016 Resulting from Differences Between Assumed Experience & Actual Experience

Type of Activity	(Gain) or Loss for Year End 2016
1. Age & Service Retirements. Generally, if members retire at older ages or with smaller benefits than assumed, there is a gain. If they retire at younger ages or have higher average pays, a loss occurs.	\$ 2,300,000
2. Disability Retirements. If disability claims are less than assumed, there is a gain. If more claims, a loss.	2,200,000
3. Deaths. If more deaths occur than assumed, there is a gain. If fewer, there is a loss.	(13,600,000)
4. Withdrawal from Employment. If more liabilities are released by withdrawals than assumed, there is a gain. If smaller releases, a loss.	(4,300,000)
5. Pay Increases. If there are smaller pay increase than assumed, there is a gain. If greater increases, a loss.	(42,800,000)
6. New Entrants. All new entrants to the System create a loss.	23,000,000
7. Other. Miscellaneous gains and losses resulting from data adjustments, employee transfers, valuation methods, etc.	(19,500,000)
8. (Gain) or Loss During Year From Financial Experience.	36,300,000
9. Composite (Gain) or Loss During Year.	\$ (16,400,000)

Solvency Test

The OPERS funding objective is to be able to pay long-term benefit promises through contributions that remain approximately level from year to year as a percent of salaries earned by members. In this way, members and employers in each year pay their fair share for retirement service accrued in that year by OPERS members.

If the retirement system follows level contribution rate financing principles, the system will pay all promised benefits when due – the ultimate test of financial soundness.

A short-term solvency test is one means of monitoring OPERS funding progress. In a short-term solvency test, the retirement System’s present valuation assets are compared with: 1) active member contributions on deposit, 2) the liabilities for future benefits to persons who have retired and the liabilities for terminated employees with vested benefits, and 3) the liabilities for service already rendered by active members. In a system that has been following the discipline of level contribution rate financing, the liabilities for member contributions on deposit (liability 1), the liabilities for future benefits to present retirees and the liabilities for future benefits for terminated employees (liability 2) will be fully covered by present assets, except in rare circumstances.

In addition, the liabilities for service already rendered by members (liability 3) will be partially covered by the remainder of present assets. Generally, if the system has been using level contribution rate financing, the funded portion of liability 3 will increase over time; however, a decrease generally occurs in those years when substantial benefit improvements are granted by the Legislature. It is unusual for liability 3 to be fully funded. The funded ratio of the System based on total actuarial accrued liabilities (1 + 2 + 3) provides an indication of how well the System is funded.

The schedule below illustrates the progress of funding the actuarial accrued liabilities of OPERS.

Date	Actuarial Accrued Liability and Valuation Assets (in thousands)					Portion of Actuarial Accrued Liability Covered by Reported Assets			
	Active Member Contributions (Liability 1)	Retirees, Beneficiaries and Terminated Vested Members (Liability 2)	Employer Financed Portion of Active Members (Liability 3)	Total Liability (1 + 2 + 3)	Reported Assets ¹	(1)	(2)	(3)	Funded Ratio of Total Accrued Actuarial Liability
July 1, 2007	\$409,159	\$4,363,690	\$3,640,399	\$8,413,248	\$6,110,230	100%	100%	36.7%	72.6%
July 1, 2008	439,754	4,623,210	3,831,323	8,894,287	6,491,928	100	100	37.3	73.0
July 1, 2009	466,880	4,913,032	3,911,546	9,291,458	6,208,245	100	100	21.2	66.8
July 1, 2010	487,980	5,252,862	3,881,786	9,622,628	6,348,416	100	100	15.8	66.0
July 1, 2011	488,418	4,677,760	3,013,590	8,179,768	6,598,628	100	100	47.5	80.7
July 1, 2012	505,373	4,832,068	2,997,197	8,334,638	6,682,200	100	100	44.9	80.2
July 1, 2013	517,653	5,032,769	3,005,700	8,556,122	6,978,873	100	100	47.5	81.6
July 1, 2014	534,081	5,184,818	3,034,770	8,753,669	7,759,258	100	100	67.2	88.6
July 1, 2015	537,046	5,417,604	3,041,476	8,996,126	8,420,307	100	100	81.1	93.6
July 1, 2016	545,020	5,757,019	3,125,771	9,427,810	8,790,886	100	100	79.6	93.2

¹Actuarial value of assets based on the smoothing technique adopted by Board.

Schedule of Active Member Valuation Data

Valuation Date	Number	Annual Payroll	Annual Average Pay	% Increase in Average Pay
July 1, 2016	41,806	\$1,790,809,603	\$42,836	3.82
July 1, 2015	43,843	1,808,972,785	41,260	3.97
July 1, 2014	43,947	1,744,041,536	39,685	1.29
July 1, 2013	43,273	1,695,347,809	39,178	2.08
July 1, 2012	42,569	1,633,837,374	38,381	(0.90)
July 1, 2011	40,551	1,570,500,148	38,729	1.06
July 1, 2010	43,934	1,683,697,139	38,323	1.01
July 1, 2009	45,683	1,732,975,532	37,935	1.72
July 1, 2008	45,120	1,682,663,413	37,293	2.50
July 1, 2007	44,712	1,626,737,832	36,383	5.49

Schedule of Retirants, Disabled Retirants, and Beneficiaries Added to and Removed from Rolls

Year Ended	Added to Rolls		Removed from Rolls		Rolls – End of Year		% Increase in Annual Allowances	Average Annual Allowances
	Number	Annual Allowances	Number	Annual Allowances	Number	Annual Allowances		
June 30, 2016	1,986	\$37,356,248	991	\$ 12,505,069	33,749	\$553,631,087	4.70	\$16,404
June 30, 2015	1,898	35,731,879	977	11,895,298	32,754	528,779,908	4.72	16,144
June 30, 2014	1,667	28,477,713	969	11,707,809	31,833	504,943,327	3.44	15,862
June 30, 2013	1,767	31,633,122	895	10,184,240	31,135	488,173,423	4.60	15,679
June 30, 2012	1,703	29,234,998	858	10,430,214	30,263	466,724,541	4.20	15,422
June 30, 2011	2,232	40,890,700	823	9,670,100	29,418	447,919,757	7.49	15,226
June 30, 2010	1,867	32,394,848	807	9,942,962	28,009	416,699,157	5.69	14,877
June 30, 2009	1,595	27,216,987	679	9,117,210	26,949	394,247,271	4.81	14,629
June 30, 2008	1,526	23,815,666	790	8,508,891	26,033	376,147,494	8.42	14,449
June 30, 2007	1,620	25,583,722	759	8,045,442	25,233	346,932,229	5.21	13,749

Summary of System Provisions

Effective Date: The System became effective January 1, 1964. The fiscal year is July 1 to June 30.

Employees Included: All permanent employees of the State of Oklahoma, and any other employer such as a county, county hospital, city or town, conservation districts, circuit engineering districts, and any trust in which a county, city, or town participates and is the primary beneficiary, are eligible to join if:

- the employee is not eligible for or participating in another retirement system authorized under Oklahoma law, is covered by Social Security and not participating in the U.S. Civil Service Retirement System,
- the employee is scheduled for 1,000 hours per year and salary is not less than the hourly rate of the monthly minimum wage for State employees (for employees of local government employers, not less than the hourly rate of the monthly minimum wage for such employees).

Membership is mandatory for new eligible employees on the first of the month following employment.

Employee and Employer Contributions: 3.5% of pay for most State employees and 16.5% for employers. Local employees, elected officials, members covered by the Department of Corrections Hazardous Duty provisions, and members who elect the step up provision contribute at varying rates.

Final Average Compensation: Generally the highest annual average of any thirty-six months within the last ten years of participating service. For members hired on or after July 1, 2013, the highest annual average of any sixty months within the last ten years of participating service.

Retirement Date:
Normal: Age 62 (age 60 for elected officials), 80 age/service points if hired before July 1, 1992, 90 age/service points if hired on or after July 1, 1992.

For non-elected employees hired on or after November 1, 2011, the retirement age is age 65 or 90 age/service points if at least 60. For elected officials hired on or after November 1, 2011, age 65 with 8 years of service or 62 with 10 years of service.

Summary of System Provisions (continued)

20 years of service for certain members covered by the Department of Corrections Hazardous Duty provisions and certain Oklahoma Military Department Firefighters.

Early:

Age 55 with 10 years of service.

Normal Retirement Benefit:

General formula is 2% of final average compensation multiplied by years of credited service.

Disability Benefit:

After eight years of service, provided the member qualifies for disability benefits as certified either by the Social Security Administration or the Railroad Retirement Board. Benefit is determined by the normal retirement formula based on service and salary history at date of disability. The benefit is payable immediately without actuarial reduction.

In-service Death Benefit:

If the deceased member was vested, the benefit that would have been paid the member had he retired and elected the joint and 100% survivor option (Option B).

For elected officials, it is 50% of the benefit that would have been paid the member had he retired.

Postretirement Death Benefit:

\$5,000 lump-sum.

Forms of Payment:

Life annuity, joint and 50% survivor, joint and 100% survivor annuity, life annuity with a minimum of 120 monthly payments, and Medicare Gap Benefit option.

Supplemental

Medical Insurance Premium:

The System will contribute the lesser of \$105 per month or the Medicare Supplement Premium to the Office of Management and Enterprise Services, Employees Group Insurance Division (or other eligible employer health plans) for members receiving retirement benefits.

Summary of Actuarial Assumptions and Methods

1. The investment return rate used in the valuation was 7.25 percent per year, net of investment expenses, compounded annually. This rate of return is not the assumed real rate of return. The real rate of return is the rate of return in excess of the inflation rate. Considering other financial assumptions, the 7.25 percent investment return rate translates to an assumed real rate of return of 4.25 percent.
2. The RP-2000 Mortality Table projected to 2010 using Scale AA for males and females is used for preretirement and postretirement mortality for all non-disabled members and beneficiaries.
3. The probabilities of withdrawal from service, together with individual pay increase assumptions, are shown in Schedule 1.
4. The probabilities of retirement with an age and service allowance are shown in Schedules 2A, 2B and 2C.
5. Because of the passage of House Bill 2132, benefits are not assumed to increase due to future ad hoc cost-of-living increases.
6. The individual entry-age normal actuarial cost method of valuation was used in determining actuarial accrued liability and normal cost. Actuarial gains and losses reduce or increase the unfunded actuarial accrued liability and are amortized over the remaining amortization period (11 years as of July 1, 2016).
7. The actuarial value of assets is based on a five-year moving average of expected actuarial values and market values. A preliminary expected value is determined equal to the prior year's actuarial value of assets plus net cash flow for the year ending on the valuation date, assuming the valuation investment return. The expected actuarial asset value is equal to the preliminary expected actuarial value plus the unrecognized investment gains and losses as of the beginning of the previous fiscal year. Twenty percent (20%) of the gain/loss as measured by the difference between the expected actuarial value and the market value at the valuation date is added to the preliminary expected actuarial value plus twenty percent (20%) of the unrecognized gains or losses for the four preceding fiscal years. The final result is constrained to a value no less than 80% and no more than 120% of the market value at the valuation date.
8. The actuarial assumptions and methods used in the valuation were adopted by the Board based on System experience from July 1, 2010 through June 30, 2013.

Summary of Actuarial Assumptions and Methods (continued)

Schedule 1

Withdrawal From Active Employment Before Age & Service Retirement and Individual Pay Increase Assumptions

Sample Service Values	Withdrawal	Sample Ages	Percent Increase in Individual's Pay During Next Year
1	22.0%	25	7.4%
5	10.5	30	6.1
10	6.0	35	5.5
15	3.1	40	5.2
20	2.0	45	4.8
25	1.0	50	4.5
		55	4.5

Schedule 2A

Percent of Eligible Regular Non-Elected Active Members Retiring Within Next Year

Those Eligible for Unreduced Retirement and Hired Before November 1, 2011

Retirement Ages	Percent	Retirement Ages	Percent
50	20%	61	20%
51	20%	62	30%
52	20%	63	15%
53	20%	64	15%
54	20%	65	30%
55	10%	66	20%
56	10%	67	20%
57	11%	68	20%
58	12%	69	25%
59	13%	70	100%
60	14%		

Summary of Actuarial Assumptions and Methods (continued)

Those Eligible for Unreduced Retirement and Hired on or after November 1, 2011

Retirement	
Ages	Percent
60	*
61	*
62	*
63	*
64	*
65	*
66	20%
67	20%
68	20%
69	25%
70	100%

*30% when first eligible and 15% thereafter.

Schedule 2B

Percent of Eligible Non-Elected Active Members Retiring Within Next Year

Those Not Eligible for Unreduced Retirement or Department of Corrections Members With Less Than 20 Years of Service, hired before November 1, 2011

Regular Employees		Department of Corrections			
Retirement		Retirement		Retirement	
Ages	Percent	Ages	Percent	Ages	Percent
55	3%	55	4%	63	22%
56	4%	56	5%	64	25%
57	4%	57	5%	65	40%
58	5%	58	6%	66	25%
59	6%	59	7%	67	23%
60	6%	60	7%	68	22%
61	15%	61	20%	69	21%
		62	40%	70	100%

Summary of Actuarial Assumptions and Methods (continued)

Those Not Eligible for Unreduced Retirement and hired on or after November 1, 2011

Regular Employees		Department of Corrections			
Retirement		Retirement		Retirement	
Ages	Percent	Ages	Percent	Ages	Percent
60	7%	60	7%	66	25%
61	7%	61	20%	67	23%
62	20%	62	20%	68	22%
63	15%	63	20%	69	21%
64	15%	64	20%	70	100%
		65	40%		

Schedule 2C

Percent of Eligible Active Members Retiring Within Next Year
 Department of Corrections Members With More Than 20 Years of Service

Service	Percent
20	25%
21	25%
22	20%
23 - 24	15%
25 - 29	23%
30 - 34	25%
35	100%