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Teachers' Retirement System of the State of Kentucky Report of the Actuary on the Annual Valuation

Prepared as of June 30, 2013

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December 6, 2013

Board of Trustees
Teachers' Retirement System of the
State of Kentucky
479 Versailles Road
Frankfort, KY 40601-3800

Members of the Board:

Section 161.400 of the law governing the operation of the Teachers' Retirement System of the State of Kentucky provides that the actuary shall make an actuarial valuation of the System. We have submitted the results of the annual actuarial valuation prepared as of June 30, 2013. While not verifying the data at source, the actuary performed tests for consistency and reasonability. The combined member and state contributions for the fiscal year ending June 30, 2016 required to support the benefits of the System are as follows:

Group	Combined Member and State Contribution Requirement
University members hired before July 1, 2008	34.34%
University members hired on or after July 1, 2008	35.34%
Non-University members hired before July 1, 2008	37.30%
Non-University members hired on or after July 1, 2008	38.30%

These rates represent an increase since the previous valuation in the Pension required employer contribution rate of 2.45% of payroll for the fiscal year ending June 30, 2016. In addition, there has been a net decrease in the expected state special appropriation from 3.00% to 2.90%, or 0.10% of payroll and no change in the amount required for life insurance benefits. Therefore, the net impact on the required increase in the total employer contribution rate is 2.55% of payroll.

For the fiscal year ending June 30, 2016, in addition to the State statutory contribution rates and the state special appropriation, there is a required increase in the employer contribution rate of 12.97%; 2.55% from this valuation and 10.42% from the previous valuation.

The financing objective of the System is that contribution rates will remain relatively level over time as a percentage of payroll. The promised benefits of the System are included in the actuarially calculated contribution rates which are developed using the entry age normal cost method.

Five-year market related value of plan assets is used for actuarial valuation purposes. Gains and losses are reflected in the unfunded accrued liability that is being amortized by regular annual contributions as a level percentage of payroll within a 30-year period, on the assumption that payroll will increase by 4.0% annually. The assumptions recommended by the actuary and adopted by the Board are 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 GASB 25 and 27.

We have prepared the trend information shown in the Schedule of Funding Progress in the Financial Section of the Annual Report and Schedule A, Schedule B, Schedule C, Solvency Test and Analysis of Financial Experience shown in the Actuarial Section of the Annual Report.

The valuation reflects that a portion of the annual required contributions to the fund from 2005 to 2010 were allocated to the Medical Insurance Fund and are being repaid over time. A pension obligation bond was issued August 26, 2010 and was used to repay the balances of a substantial portion of the loans previously made to the Medical Insurance Fund. No additional contributions were allocated during the 2013 fiscal year.

This is to certify that the independent consulting actuary is a member of the American Academy of Actuaries and has experience in performing valuations for public retirement systems, that the valuation was prepared in accordance with principles of practice prescribed by the Actuarial Standards Board, and that 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.

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.

In our opinion, the System is not being funded on an actuarially sound basis since the actuarially required contributions are not being made by the employer. If contributions by the employer to the System continue to be less than those required, the assets are expected to become insufficient to pay promised benefits. Assuming that contributions to the System are made by the employer from year to year in the future at rates recommended on the basis of the successive actuarial valuations, the continued sufficiency of the assets to provide the benefits called for under the System may be safely anticipated.

Respectfully submitted,

Edward A. Macdonald, ASA, FCA, MAAA
President

Edward J. Koebel, EA, FCA, MAAA
Principal and Consulting Actuary

EAM/EJK:kc

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TEACHERS' RETIREMENT SYSTEM
OF THE STATE OF KENTUCKY
REPORT OF ACTUARY ON THE VALUATION
PREPARED AS OF JUNE 30, 2013

SECTION I - SUMMARY OF PRINCIPAL RESULTS

1. For convenience of reference, the principal results of the valuation and a comparison with the results of the previous valuation are summarized below (all dollar amounts are $1,000's):

Valuation Date	June 30, 2013	June 30, 2012
Number of active members	74,831	75,951
Annual salaries	$ 3,480,066	$ 3,479,567
Number of annuitants and beneficiaries	47,406	46,094
Annual allowances	$ 1,608,659	$ 1,525,184
Assets:		
Market value	$ 16,108,808	$ 14,797,121
Actuarial value	14,962,758	14,691,371
Unfunded actuarial accrued liability	$ 13,854,474	$ 12,282,483
Funded Ratio	51.9%	54.5%
Amortization period (years)	30	30

Contribution rates are shown separately for university and non-university members on the following pages.

CONTRIBUTION RATES FOR UNIVERSITY MEMBERS

Valuation Date	June 30, 2013		June 30, 2012	
For fiscal year ending:	June 30, 2016		June 30, 2015	
	Members hired before 7/1/2008	Members on and after 7/1/2008	Members hired before 7/1/2008	Members on and after 7/1/2008
Pension Plan:				
Normal	12.290%	12.290%	11.790%	11.790%
Accrued liability	22.050	23.050	20.100	21.100
Total	34.340%	35.340%	31.890%	32.890%
Member	7.625%	7.625%	7.625%	7.625%
State (ARC)	26.715	27.715	24.265	25.265
Total	34.340%	35.340%	31.890%	32.890%
Life Insurance Fund:				
State	0.030%	0.030%	0.030%	0.030%
Medical Insurance Fund:				
Member	2.775%	2.775%	2.270%	2.270%
State Match	2.775	1.775	2.270	1.270
Total	5.550%	4.550%	4.540%	3.540%
Total Contributions	39.920%	39.920%	36.460%	36.460%
Member Statutory	10.400%	10.400%	9.895%	9.895%
State Statutory	13.650	13.650	13.145	13.145
Required Increase	12.970	12.970	10.420	10.420
State Special	2.900	2.900	3.000	3.000
Total	39.920%	39.920%	36.460%	36.460%

CONTRIBUTION RATES FOR NON-UNIVERSITY MEMBERS

Valuation Date	June 30, 2013		June 30, 2012	
For fiscal year ending:	June 30, 2016		June 30, 2015	
	Members hired before 7/1/2008	Members on and after 7/1/2008	Members hired before 7/1/2008	Members on and after 7/1/2008
Pension Plan:				
Normal	15.810%	15.810%	15.150%	15.150%
Accrued liability	21.490	22.490	19.700	20.700
Total	37.300%	38.300%	34.850%	35.850%
Member	9.105%	9.105%	9.105%	9.105%
State (ARC)	28.195	29.195	25.745	26.745
Total	37.300%	38.300%	34.850%	35.850%
Life Insurance Fund:				
State	0.030%	0.030%	0.030%	0.030%
Medical Insurance Fund:				
Member	3.750%	3.750%	3.000%	3.000%
State Match	3.750	2.750	3.000	2.000
Total	7.500%	6.500%	6.000%	5.000%
Total Contributions	44.830%	44.830%	40.880%	40.880%
Member Statutory	12.855%	12.855%	12.105%	12.105%
State Statutory	16.105	16.105	15.355	15.355
Required Increase	12.970	12.970	10.420	10.420
State Special	2.900	2.900	3.000	3.000
Total	44.830%	44.830%	40.880%	40.880%

2. The valuation includes only the assets and liabilities associated with the pension plan. The valuation of the Medical Insurance Fund and the Active and Retired Life Insurance Benefits will be prepared separately.

3. Comments on the valuation results as of June 30, 2013 are given in Section IV and further discussion of the contribution levels is set out in Sections V and VI.

4. Schedule B shows the development of the actuarial value of assets. Schedule E of this report outlines the full set of actuarial assumptions and methods employed in the current valuation. There have been no changes since the previous valuation.

5. The System currently uses a smoothed interest rate methodology to determine liabilities. The development of the smoothed interest rate used in the June 30, 2013 valuation is shown in Schedule D.

6. Provisions of the System, as summarized in Schedule G, were taken into account in the current valuation. There have been no changes since the previous valuation.

SECTION II - MEMBERSHIP DATA

1. Data regarding the membership of the System for use as a basis of the valuation were furnished by the Retirement System office. The following table shows the number of active members and their annual salaries as of June 30, 2013 on the basis of which the valuation was prepared.

GROUP	NUMBER	ANNUAL SALARIES ($1,000's)
University Full Time	3,420	$216,260
University Part Time	170	3,753
Non-University Full Time	54,970	3,149,837
Non-University Part Time	16,271	110,216
Total	74,831	$ 3,480,066

The table reflects the active membership for whom complete valuation data was submitted. The results of the valuation were adjusted to take account of inactive members and members for whom incomplete data was submitted.

2. The following table shows the number and annual retirement allowances payable to annuitants and beneficiaries on the roll of the Retirement System as of the valuation date.

THE NUMBER AND ANNUAL RETIREMENT ALLOWANCES OF ANNUITANTS AND BENEFICIARIES ON THE ROLL AS OF JUNE 30, 2013

GROUP	NUMBER	ANNUAL RETIREMENT ALLOWANCES[1] ($1,000's)
Service Retirements	41,299	$ 1,467,843
Disability Retirements	2,582	71,414
Beneficiaries of Deceased Members	3,525	69,402
Total	47,406	$ 1,608,659

[1] Includes cost-of-living adjustments effective through July 1, 2013.

3. Table 1 of Schedule H shows a distribution by age and years of service of the number and annual salaries of active members included in the valuation, while Table 2 shows the number and annual retirement allowances of annuitants and beneficiaries included in the valuation, distributed by age.

SECTION III - ASSETS

1. As of June 30, 2013 the market value of Pension Plan assets for valuation purposes held by the System amounted to $16,108,808,305. This value excludes assets in the Medical Insurance Fund, the 403(b) Program Reserve Fund, and the Life Insurance Fund, which are not included in the assets used for Pension Plan valuation purposes.
2. The five-year market related value of Pension Plan assets used for valuation purposes as of June 30, 2013 was $14,962,758,316. Schedule B shows the development of the actuarial value of assets as of June 30, 2013.
3. Schedule C shows the receipts and disbursements for the year preceding the valuation date and a reconciliation of the asset balances for the Pension Plan.

SECTION IV - COMMENTS ON VALUATION

1. Schedule A of this report contains the valuation balance sheet which shows the present and prospective assets and liabilities of the System as of June 30, 2013. The valuation was prepared in accordance with the actuarial assumptions and the actuarial cost method, which are described in Schedule E and Schedule F.
2. The valuation balance sheet shows that the System has total prospective liabilities of $16,338,399,389 for benefits expected to be paid on account of the present active members. The liability on account of benefits payable to annuitants and beneficiaries amounts to $17,449,169,220 of which $866,151,523 is for special appropriations remaining to be made toward funding minimum annuities, ad hoc increases and sick leave allowances granted after 1981. The liability for benefits expected to be paid to inactive members and to members entitled to deferred vested benefits is $267,223,294. The total prospective liabilities of the System amounts to $34,054,791,903. Against these liabilities, the System has present assets for valuation purposes of $14,962,758,316. When this amount is deducted from the total liabilities of $34,054,791,903, there remains $19,092,033,587 as the present value contributions to be made in the future.

3. The employer's contributions to the System consist of normal contributions and accrued liability contributions. The valuation indicates that employer normal contributions at the rate of 12.29% of payroll for University and 15.81% of payroll for Non-University are required.

4. Prospective normal employer and employee contributions have a present value of $5,237,559,515. When this amount is subtracted from $19,092,033,587, which is the present value of the total future contributions to be made by the employer, there remains $13,854,474,072 as the amount of future unfunded accrued liability contributions.

SECTION V - CONTRIBUTIONS PAYABLE UNDER THE SYSTEM

1. Section 161.540 of the retirement law provides that each university member contribute 10.400% of annual salary to the System and each non-university member contribute 12.855% of annual salary. Of this amount, for each university member, 2.775% is paid to the Medical Insurance Fund for medical benefits and for each non-university member, 3.75% is paid to the Medical Insurance Fund for medical benefits. The remainder, 7.625% for university members and 9.105% for non-university members, is applicable for the retirement benefits taken into account in the valuation.

2. Section 161.550 provides that the State will match a portion of the member contributions and contribute a supplemental 3.25% of members' salaries towards discharging the System's unfunded obligations. Additional contributions are made to the Medical Insurance Fund as required under 161.550(3).

3. Therefore for university members, 10.875% of the salaries of active members who become members before July 1, 2008 and 11.875% of the salaries of active members who become members on or after July 1, 2008 is funded by statute or supplemental funding for the Pension Plan and Life Insurance Fund. For non-university members, 12.355% of the salaries of active members who become members before July 1, 2008 and 13.355% of the salaries of active members who become members on or after July 1, 2008 is funded by statute or supplemental funding for the Pension Plan and Life Insurance Fund. Of these amounts, 0.03% of payroll will be allocated to the Life Insurance Fund. Based on the results of the valuation, an additional 12.97% of payroll for both university and non-university will be required in order to maintain the amortization of the unfunded

liability of the Pension Plan within a 30-year period. An additional special appropriation of 2.90% of total payroll will be made by the State. Therefore, the total required employer contribution rate to the Pension Plan is 26.715% for university members who become members before July 1, 2008 and 27.715% for university members who become members on or after July 1, 2008. The total required employer contribution rate to the Pension Plan is 28.195% for non-university members who become members before July 1, 2008 and 29.195% for non-university members who become members on or after July 1, 2008. The total member and employer contribution rates to the Pension Plan are shown in the following table.

CONTRIBUTION RATES BY SOURCE

UNIVERSITY

	Members hired before 7/1/2008	Members hired on and after 7/1/2008
Member		
Statutory Total	10.400%	10.400%
Statutory Medical Insurance Fund	(2.775)	(2.775)
Contribution to Pension Plan	7.625%	7.625%
Employer		
Statutory Matching Total	10.400%	10.400%
Statutory Medical Insurance Fund	(2.775)	(1.775)
Supplemental Funding	3.250	3.250
Subtotal	10.875%	11.875%
Life Insurance	(0.030)%	(0.030)%
Additional to Maintain 30-Year Amortization	12.970	12.970
Special Appropriation	2.900	2.900
Contribution to Pension Plan	26.715%	27.715%
Total Contribution to Pension Plan	34.340%	35.340%

NON-UNIVERSITY

	Members hired before 7/1/2008	Members hired on and after 7/1/2008
Member		
Statutory Total	12.855%	12.855%
Statutory Medical Insurance Fund	(3.750)	(3.750)
Contribution to Pension Plan	9.105%	9.105%
Employer		
Statutory Matching Total	12.855%	12.855%
Statutory Medical Insurance Fund	(3.750)	(2.750)
Supplemental Funding	3.250	3.250
Subtotal	12.355%	13.355%
Life Insurance	(0.030)%	(0.030)%
Additional to Maintain 30-Year Amortization	12.970	12.970
Special Appropriation	2.900	2.900
Contribution to Pension Plan	28.195%	29.195%
Total Contribution to Pension Plan	37.300%	38.300%

4. The valuation indicates that normal contributions at the rate of 12.29% of active university members' salaries and 15.81% of active non-university members' salaries are required. The difference between the total contribution rate and the normal rate remains to be applied toward the liquidation of the unfunded actuarial accrued liability. This accrued liability rate is 22.05% for university members hired before July 1, 2008, 23.05% for university members hired on and after July 1, 2008, 21.49% for non-university members hired before July 1, 2008, and 22.49% for non-university members hired on and after July 1, 2008. These rates include special appropriations of 2.90% of payroll to be made by the State. These rates are shown in the following table.

ACTUARIALLY DETERMINED CONTRIBUTION RATES

RATE	PERCENTAGE OF ACTIVE MEMBERS' SALARIES			
	UNIVERSITY		NON-UNIVERSITY	
	Members hired before 7/1/2008	Members hired on and after 7/1/2008	Members hired before 7/1/2008	Members hired on and after 7/1/2008
Normal	12.29%	12.29%	15.81%	15.81%
Accrued liability*	22.05	23.05	21.49	22.49
Total	34.34%	35.34%	37.30%	38.30%

* Includes special appropriations of 2.90% of payroll to be made by the State.

5. The unfunded actuarial accrued liability amounts to $13,854,474,072 as of the valuation date. Accrued liability contributions at the rates in the table above are sufficient to amortize the unfunded actuarial accrued liability over a 30-year period, based on the assumption that the payroll will increase by 4.0% annually.

SECTION VI - COMMENTS ON LEVEL OF FUNDING

1. Our calculations indicate that the contribution rates shown in the previous section will be sufficient to cover the benefits of the System, the annual 1.5% increases in the allowances of retired members and beneficiaries, and the liabilities for minimum annuities, ad hoc increases and sick leave allowances granted after 1981.

2. The valuation indicates that the present statutory contribution rates, supplemental funding and special appropriations, if continued at the current level percentage, along with an additional required contribution of 12.97%, not currently provided in statute, are sufficient to meet the cost of benefits currently accruing and provide for the amortization of the unfunded actuarial accrued liability over a period of 30 years. However, as existing special contributions expire, the statutory contributions or supplemental funding will be required to increase as an equal percentage of payroll, in order to amortize the unfunded liability within a period of 30 years.

3. During the 2005 through 2010 fiscal years, a portion of the contributions required for the pension fund were allocated as loans to the Medical Insurance Fund for Stabilization Funding. Beginning with the 2009 fiscal year, contributions have also been allocated as loans for non-single subsidy funding. Payments are being made to repay these loans. In August 2010, a pension obligation bond was issued with proceeds used to fully repay the loans for the Stabilization Funding. Beginning with the 2011 fiscal year, there have been no further loans for Stabilization Funding. In addition, there were no loans for single-subsidy funding for fiscal year 2013. The table on the following page shows the amounts borrowed, annual payments and remaining balances for the non-single subsidy funding as of June 30, 2013:

MEDICAL INSURANCE FUND STABILIZATION FUNDING

	Loan Amount	Annual Payment	Balances as of June 30, 2013
2008/2009	$ 8,400,000	$ 1,228,900	$ 5,894,178
2009/2010	9,200,000	1,345,200	7,274,266
2010/2011	10,700,000	1,564,500	9,348,301
2011/2012	12,300,000	1,798,700	11,695,480
Total	$ 40,600,000	$ 5,937,300	$ 34,212,225

4. There are no excess assets or contributions available to provide additional benefits, and there is a cumulative increase in the required employer contribution of 12.97% of payroll for the fiscal year ending June 30, 2016, as shown in the following table:

Valuation Date	Fiscal Year	Increase	Cumulative Increase	Amount
June 30, 2004	June 30, 2007	0.11%	0.11%	$ 3,174,600
June 30, 2005	June 30, 2008	1.21	1.32	38,965,900
June 30, 2006	June 30, 2009	0.56	1.88	60,499,800
June 30, 2007	June 30, 2010	0.58	2.46	82,331,200
June 30, 2008	June 30, 2011	1.13	3.59	121,457,000
June 30, 2009	June 30, 2012	2.22	5.81	208,649,000
June 30, 2010	June 30, 2013	1.46	7.27	260,980,000
June 30, 2011	June 30, 2014	0.75	8.02	299,420,000
June 30, 2012	June 30, 2015	2.40	10.42	386,400,000
June 30, 2013	June 30, 2016	2.55	12.97	487,400,000

In addition, as existing special contributions expire, the statutory contributions or supplemental funding will be required to increase as an equal percentage of payroll, in order to amortize the unfunded liability within 30 years. Any further benefit improvements must be accompanied by the entire additional contributions necessary to support the benefits.

SECTION VII – ANALYSIS OF FINANCIAL EXPERIENCE

The following table shows the estimated gain or loss from various factors that resulted in an increase of $1,571,991,157 in the unfunded accrued liability from $12,282,482,915 to $13,854,474,072 during the year ending June 30, 2013.

ANALYSIS OF FINANCIAL EXPERIENCE
(Dollar amounts in thousands)

ITEM	AMOUNT OF INCREASE/ (DECREASE)
Interest (8.00%) added to previous unfunded accrued liability	$ 982,599
Expected Accrued liability contribution	(361,788)
Contributions allocated to the Medical Insurance Fund (MIF) for Stabilization Funding during 2012/2013 fiscal year with interest	0
Repayment of prior year's MIF Stabilization Funding with interest	(6,175)
Experience:	
Valuation asset growth	146,608
Pensioners' mortality	14,889
Turnover and retirements	(27,490)
New entrants	54,236
Salary increases	(151,629)
Amendments	0
Assumption changes*	920,741
Method changes	0
Total	$ 1,571,991

* Change occurs due to interest smoothing methodology.

SECTION VIII - ACCOUNTING INFORMATION

1. Governmental Accounting Standards Board Statements 25 and 27 set forth certain items of required supplementary information to be disclosed in the financial statements of the System and the employer. One such item is a distribution of the number of employees by type of membership, as follows:

NUMBER OF ACTIVE AND RETIRED MEMBERS
AS OF JUNE 30, 2013

GROUP	NUMBER
Retirees and beneficiaries currently Receiving benefits	47,406
Terminated employees entitled to Benefits but not yet receiving benefits	7,194
Active plan members	74,831
Total	129,431

2. Another such item is the schedule of funding progress as shown below.

SCHEDULE OF FUNDING PROGRESS
(Dollar amounts in thousands)

Actuarial Valuation Date	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL)* (b)	Unfunded AAL (UAAL) (b - a)	Funded Ratio (a / b)	Covered Payroll (c)	UAAL as a Percentage of Covered Payroll ((b - a) / c)
6/30/2008	$15,321,325	$22,460,304	$ 7,138,979	68.2%	$3,190,332	223.8%
6/30/2009	14,885,981	23,400,426	8,514,445	63.6	3,253,077	261.7
6/30/2010	14,851,330	24,344,316	9,492,986	61.0	3,321,614	285.8
6/30/2011**	14,908,138	25,968,692	11,060,554	57.4	3,451,756	320.4
6/30/2012	14,691,371	26,973,854	12,282,483	54.5	3,479,567	353.0
6/30/2013	14,962,758	28,817,232	13,854,474	51.9	3,480,066	398.1

* Funding method Projected Unit Credit prior to 6/30/2011
Funding method Entry Age Normal 6/30/2011 and after

** Reflects change in assumptions and methods

3. The information presented in the required supplementary schedules was determined as part of the actuarial valuation at June 30, 2013. Additional information as of the latest actuarial valuation follows.

Valuation date	6/30/2013
Actuarial cost method	Entry Age
Amortization method	Level percent of pay, open
Remaining amortization period	30 years
Asset valuation method	5-year smoothed market
Actuarial assumptions:	
Ultimate Investment Rate of Return*	7.50%
Projected salary Increases**	4.00 - 8.20%
Cost-of-living adjustments	1.50% Annually
*Includes price inflation at	3.50%
**Includes wage inflation at	4.00%

SCHEDULE OF EMPLOYER CONTRIBUTIONS

Fiscal Year Ending June 30	Annual Required Contributions	Actual Employer Contributions	Percentage Contributed
2008	$ 563,789,483	$ 466,247,783	83%
2009	600,282,735	442,549,935	74
2010	633,938,088	479,805,088	76
2011	678,741,428	1,037,935,993*	153
2012	757,822,190	557,339,552	74
2013	802,984,644	568,233,446	71

* Includes Pension Obligation Bond proceeds of $465,384,165

5. Following is the calculation of the annual pension cost and net pension obligation for the fiscal year ending June 30, 2013. Since KTRS is a cost sharing multi employer pension plan, GASB Statement 27 does not require the participating employers to disclose this information.

Annual Pension Cost and Net Pension Obligation for Fiscal Year Ending June 30, 2013

(a) Employer annual required contribution	$ 802,984,644
(b) Interest on net pension obligation	34,889,885
(c) Adjustment to annual required contribution	23,314,635
(d) Annual pension cost: (a) + (b) – (c)	$ 814,559,894
(e) Employer contributions made for fiscal year ending June 30, 2013	568,233,446
(f) Increase (decrease) in net pension obligation: (d) – (e)	$ 246,326,448
(g) Net pension obligation beginning of fiscal year	436,123,560
(h) Net pension obligation end of fiscal year: (f) + (g)	$ 682,450,008

TREND INFORMATION

Year Ending	Annual Pension Cost (APC)	Percentage of APC Contributed	Net Pension Obligation (NPO)
June 30, 2011	$691,156,239	150%	$229,548,428
June 30, 2012	763,914,684	73	436,123,560
June 30, 2013	814,559,894	70	682,450,008

SCHEDULE A

VALUATION BALANCE SHEET
SHOWING THE PRESENT AND PROSPECTIVE ASSETS AND LIABILITIES
AS OF JUNE 30, 2013
(Dollar amounts in thousands)

	ACTUARIAL LIABILITIES		
(1)	Present value of prospective benefits payable on account of present active members		
	- Service retirement benefits	$ 15,237,753	
	- Disability retirement benefits	742,425	
	- Death and survivor benefits	137,682	
	- Refunds of member contributions	220,539	
	Total		$ 16,338,399
(2)	Present value of prospective benefits payable on account of present retired members, beneficiaries of deceased members, and members entitled to deferred vested benefits		
	- Service retirement benefits	$ 16,155,563	
	- Disability retirement benefits	677,887	
	- Death and survivor benefits	615,720	
	Total		$ 17,449,170
(3)	Present value of prospective benefits payable on account of inactive members and members entitled to deferred vested benefits		$ 267,223
(4)	TOTAL ACTUARIAL LIABILITIES		$ 34,054,792
	PRESENT AND PROSPECTIVE ASSETS		
(5)	Actuarial value of assets		$ 14,962,758
(6)	Present value of total future contributions = (4)-(5)	$ 19,092,034	
(7)	Present value of future member contributions and employer normal contributions		5,237,560
(8)	Prospective unfunded accrued liability contributions = (6)-(7)		13,854,474
(9)	TOTAL PRESENT AND PROSPECTIVE ASSETS		$ 34,054,792

SCHEDULE A
(continued)

SOLVENCY TEST
(in millions of dollars)

Valuation Date	(1) Active Member Contributions	(2) Retirants And Beneficiaries	(3) Active Members (Employer Financed Portion)	Valuation Assets	Portion of Accrued Liabilities Covered by Assets (1)	(2)	(3)
6/30/2008	$2,899.0	$13,585.8	$5,975.5	$15,321.3	100%	91%	0%
6/30/2009	3,042.3	14,309.9	6,048.2	14,886.0	100	83	0
6/30/2010	3,196.3	15,010.4	6,137.6	14,851.3	100	78	0
6/30/2011	3,325.7	15,557.9	7,085.1	14,908.1	100	74	0
6/30/2012	3,415.2	16,472.2	7,086.4	14,691.4	100	68	0
6/30/2013	3,514.4	17,716.4	7,586.4	14,962.8	100	65	0

SCHEDULE B

DEVELOPMENT OF THE ACTUARIAL VALUE OF ASSETS
AS OF JUNE 30, 2013

(1)	Actuarial Value of Assets Beginning of Year		$ 14,691,371,043
(2)	Market Value of Assets End of Year		16,108,808,305
(3)	Market Value of Assets Beginning of Year		14,797,120,889
(4)	Cash Flow		
	a.	Contributions	872,972,174
	b.	Benefit Payments	1,592,782,018
	c.	Administrative Expense	8,377,003
	d.	Net: (4)a – (4)b – (4)c	(728,186,847)
(5)	Investment Income		
	a.	Market total: (2) – (3) – (4)d	2,039,874,263
	b.	Assumed Rate	7.50%
	c.	Amount for Immediate Recognition: [(3) x (5)b] + [(4)d x (5)b x 0.5]	1,082,477,060
	d.	Amount for Phased-In Recognition: (5)a – (5)c	957,397,203
(6)	Phased-In Recognition of Investment Income		
	a.	Current Year: 0.20 x (5)d	191,479,441
	b.	First Prior Year	(160,195,981)
	c.	Second Prior Year	363,670,625
	d.	Third Prior Year	133,378,916
	e.	Fourth Prior Year	(611,235,941)
	f.	Total Recognized Investment Gain	(82,902,940)
(7)	Actuarial Value of Assets End of Year: (1) + (4)d + (5)c + (6)f		$ 14,962,758,316
(8)	Difference Between Market & Actuarial Values: (2) – (7)		$ 1,146,049,989
(9)	Rate of Return on Actuarial Value:		6.98%

SCHEDULE C

PENSION PLAN ASSETS
SUMMARY OF RECEIPTS AND DISBURSEMENTS*
(Market Value)

	For the Year Ending	
	June 30, 2013	**June 30, 2012**
Receipts for the Year		
Contributions		
Members	$ 304,738,728	$ 309,729,924
Employers	568,233,446	557,339,552
Total	872,972,174	867,069,476
Net Investment Income	2,039,874,263	309,696,252
TOTAL	$ 2,912,846,437	$ 1,176,765,728
Disbursements for the Year		
Benefit Payments	$ 1,570,722,924	$ 1,482,939,165
Refunds to Members	22,059,094	19,549,073
Miscellaneous, including expenses	8,377,003	7,762,880
TOTAL	$ 1,601,159,021	$ 1,510,251,118
Excess of Receipts over Disbursements	$ 1,311,687,416	$ (333,485,390)
Reconciliation of Asset Balances		
Asset Balance as of the Beginning of the Year	$ 14,797,120,889	$ 15,130,606,279
Excess of Receipts over Disbursements	1,311,687,416	(333,485,390)
Asset Balance as of the End of the Year	$ 16,108,808,305	$ 14,797,120,889
Rate of Return	14.1%	2.4%

* Excludes assets for Medical Insurance Fund, the 403(b) Program Reserve Fund and the Life Insurance Fund.

SCHEDULE D

SMOOTHED INTEREST RATE

Actual Rate of Return for 5 Year Look Back Period

Fiscal Year Ending 6/30	Actual Rate of Return for Fiscal Year
2009	-14.3%
2010	13.1
2011	21.6
2012	2.4
2013	14.1

SMOOTHED INTEREST RATE: The assumed rate of return during the 25 year look forward period beginning on the valuation date. This is the investment rate of return expected to be earned during this period based on the actual rates earned during the five year look back period shown above such that the average rate of return over the combined 30 year period is equivalent to the ultimate investment rate of return (currently 7.50%). On this basis, for the June 30, 2013 valuation, the smoothed interest rate during the 25 year look forward period has been determined to be 7.68%.

ULTIMATE INVESTMENT RATE OF RETURN (DISCOUNT RATE): The assumed investment rate of return used in determining the smoothed interest rate described above. This is also the assumed investment rate of return after the 25 year look forward period and is currently 7.50%.

CORRIDOR AROUND SMOOTHED INTEREST RATE: A corridor of 0.50% around the ultimate investment rate of return is applied in determining the smoothed interest rate.

LIMITED SMOOTHED INTEREST RATE: The assumed rate of return during the 25 year look forward period as limited based on the application of the corridor above and used for valuation purposes. Since the smoothed interest rate above is 7.68% which is between the corridor, the smoothed rate has not been limited and is, therefore, 7.68%.

SCHEDULE E

OUTLINE OF ACTUARIAL ASSUMPTIONS AND METHODS

The assumptions and methods used in the valuation were selected based on the actuarial experience study prepared as of June 30, 2010, submitted to and adopted by the Board on September 19, 2011.

ULTIMATE INVESTMENT RATE OF RETURN: 7.50% per annum, compounded annually.

SALARY INCREASES: Representative values of the assumed annual rates of future salary increases are as follows and include inflation at 3.50% per annum:

Age	Annual Rate
20	8.10%
25	7.20
30	6.20
35	5.50
40	5.00
45	4.60
50	4.50
55	4.30
60	4.20
65	4.00

SEPARATIONS FROM SERVICE: Representative values of the assumed annual rates of death, disability, withdrawal, service retirement and early retirement are as follows:

Males

	Annual Rate of						
			WITHDRAWAL			RETIREMENT	
			Service			Before 27 Years of Service	After 27 Years of Service*
Age	DEATH	DISABILITY	0 – 4	5 – 9	10+		
20	0.012%	0.01%	9.00%				
25	0.015	0.01	9.00	3.00%			
30	0.020	0.02	9.00	3.00	3.00%		
35	0.035	0.05	10.00	3.25	1.75		
40	0.046	0.09	10.00	4.00	1.40		
45	0.058	0.18	11.00	4.00	1.50		17.0%
50	0.074	0.33	9.00	4.00	2.00		17.0
55	0.124	0.55	12.00	3.50	2.50	5.5%	35.0
60	0.244	0.70	12.00	3.50	2.50	13.0	24.0
62	0.324	0.70	12.00	3.50	2.50	15.0	25.0
65	0.480	0.70	12.00	3.50	2.50	21.0	26.0
70	0.821	0.70	0.00	0.00	0.00	100.0	100.0

*Plus 10% in year when first eligible for unreduced retirement with 27 years of service.

Females

Age	Annual Rate of DEATH	DISABILITY	WITHDRAWAL Service 0 – 4	5 – 9	10+	RETIREMENT Before 27 Years of Service	After 27 Years of Service*
20	0.007%	0.01%	7.00%				
25	0.008	0.02	8.50	4.00%			
30	0.010	0.04	9.00	4.00	1.65%		
35	0.017	0.08	9.00	3.75	1.85		
40	0.024	0.14	8.50	3.25	1.50		
45	0.037	0.32	7.50	3.25	1.25		15.0%
50	0.055	0.42	9.50	3.50	1.75		15.0
55	0.103	0.56	11.00	4.00	2.00	6.0%	35.0
60	0.201	0.85	11.00	4.00	2.00	14.0	30.0
62	0.263	0.85	11.00	4.00	2.00	12.0	25.0
65	0.390	0.85	11.00	4.00	2.00	22.0	30.0
70	0.672	0.85	0.00	0.00	0.00	100.0	100.0

*Plus 10% in year when first eligible for unreduced retirement with 27 years of service.

DEATHS AFTER RETIREMENT: The RP-2000 Combined Mortality Table projected to 2020 using scale AA (set back one year for females) is used for death after service retirement and beneficiaries. The RP-2000 Disabled Mortality Table (set back seven years for males and set forward five years for females) is used for death after disability retirement. Mortality improvement is anticipated under these assumptions as recent mortality experience shows actual deaths are approximately 4% greater for healthy lives and 5% greater for disabled lives than expected under the selected tables. Representative values of the assumed annual rates of death after service retirement and after disability retirement are shown below:

Age	Annual Rate of Death After: Service Retirement Male	Service Retirement Female	Disability Retirement Male	Disability Retirement Female
45	0.1161%	0.0745%	2.2571%	1.1535%
50	0.1487	0.1100	2.2571	1.6544
55	0.2469	0.2064	2.6404	2.1839
60	0.4887	0.4017	3.2859	2.8026
65	0.9607	0.7797	3.9334	3.7635
70	1.6413	1.3443	4.6584	5.2230
75	2.8538	2.1680	5.6909	7.2312
80	5.2647	3.6066	7.3292	10.0203
85	9.6240	6.1634	9.7640	14.0049
90	16.9280	11.2205	12.8343	19.4509
95	25.6992	17.5624	16.2186	23.7467

ASSETS: Five-year market related actuarial value, as developed in Schedule B. The actuarial value of assets recognizes a portion of the difference between the market value of assets and the expected actuarial value of assets, based on the ultimate assumed valuation rate of return of 7.50%. The amount recognized each year is 20% of the difference between market value and expected actuarial value.

EXPENSE LOAD: None.

PERCENT MARRIED: 100%, with females 3 years younger than males.

LOADS: Unused sick leave: 2% of active liability

VALUATION INTEREST RATE SMOOTHING: The valuation liabilities are calculated using a smoothed interest rate method. The interest rate assumed during the look forward period (currently 25 years from the valuation date) is the investment rate of return expected to be earned during the look forward period based on the actual rate of return earned during the look back period (currently 5 years) such that the average assumed rate of return over the combined 30 year period is equivalent to the assumed ultimate investment rate of return (currently 7.50%). The interest rate after the 25 year look forward period is the ultimate investment rate of return of 7.50%.

CORRIDOR LIMIT ON INTEREST RATE SMOOTHING: The smoothed interest rate used during the 25 year look forward period is limited to a corridor of 0.50% around the ultimate investment rate of return.

SCHEDULE F

ACTUARIAL COST METHOD

1. The valuation is prepared on the projected benefit basis, under which the present value, at the interest rate assumed to be earned in the future (see Schedules C and E for a description of the interest rate used), of each active member's expected benefit at retirement or death is determined, based on his age, service, sex and compensation. The calculations take into account the probability of a member's death or termination of employment prior to becoming eligible for a benefit, as well as the possibility of his terminating with a service, disability or survivor's benefit. Future salary increases and post-retirement cost-of-living adjustments are also anticipated. The present value of the expected benefits payable on account of the active members is added to the present value of the expected future payments to retired members and beneficiaries and inactive members to obtain the present value of all expected benefits payable from the System on account of the present group of members and beneficiaries.
2. The employer contributions required to support the benefits of the System are determined following a level funding approach, and consist of a normal contribution and an accrued liability contribution.
3. The normal contribution is determined using the "entry age normal" method. Under this method, a calculation is made to determine the uniform and constant percentage rate of employer contribution which, if applied to the compensation of the average new member during the entire period of his anticipated covered service, would be required in addition to the contributions of the member to meet the cost of all benefits payable on his behalf.
4. The unfunded accrued liability is determined by subtracting the present value of prospective employer normal contributions and member contributions, together with the current actuarial value of assets held, from the present value of expected benefits to be paid from the System.

SCHEDULE G

SUMMARY OF MAIN SYSTEM PROVISIONS
AS INTERPRETED FOR VALUATION PURPOSES

The Teachers' Retirement System of the State of Kentucky was established on July 1, 1940. The valuation took into account amendments to the System effective through June 30, 2013. The following summary describes the main benefit and contribution provisions of the System as interpreted for the valuation.

1 - DEFINITIONS

"Final average salary" means the average of the five highest annual salaries which the member has received for service in a covered position and on which the member has made contributions or on which the public board, institution or agency has picked up the member contributions. For a member who retires after attaining age 55 with 27 years of service, "final average salary" means the average of the three highest annual salaries.

2 - BENEFITS

Service Retirement Allowance

Members Before 7/1/2008

Condition for Allowance	Completion of 27 years of service or attainment of age 55 and 5 years of service.
Amount of Allowance	The annual retirement allowance for non-university members is equal to:

(a) 2.0% of final average salary multiplied by service before July 1, 1983, plus

(b) 2.5% of final average salary multiplied by service after July 1, 1983.

(c) For individuals who become members of the Retirement System on or after July 1, 2002 and have less than 10 years of service at retirement, the retirement allowance is 2.0% of final average salary multiplied by service. If, however, they have 10 or more years, they receive a benefit percentage of 2.5% for all years of service up to 30 years.

(d) For members retiring on or after July 1, 2004, the retirement allowance formula is 3.0% of final average salary for each year of service credit earned in excess of 30 years.

The annual retirement allowance for university members is equal to 2.0% of final average salary multiplied by all years of service.

For all members, the annual allowance is reduced by 5% per year from the earlier of age 60 or the date the member would have completed 27 years of service.

The minimum annual service allowance for all members is $440 multiplied by credited service.

Members on and after 7/1/2008

Condition for Retirement

Completion of 27 years of service, attainment of age 60 and 5 years of service or attainment of age 55 and 10 years of service.

Amount of Allowance

The annual retirement allowance for non-university members is equal to:

1.7% of final average salary if service is 10 years or less.
2.0% of final average salary if service is greater than 10 years and no more than 20 years.
2.3% of final average salary if service is greater than 20 years but no more than 26 years.
2.5% of final average salary if service is greater than 26 years but no more than 30 years.
3.0% of final average salary for years of service greater than 30 years.

The annual retirement allowance for university members is equal to:

1.5% of final average salary if service is 10 years or less.
1.7% of final average salary if service is greater than 10 years and no more than 20 years.
1.85% of final average salary if service is greater than 20 years but less than 27 years.
2.0% of final average salary if service is greater than or equal to 27 years.
.
For all members, the annual allowance is reduced by 6% per year from the earlier of age 60 or the date the member would have completed 27 years of service.

Disability Retirement Allowance

Condition for Allowance	Totally and permanently incapable of being employed as a teacher and under age 60 but after completing 5 years of service.
Amount of Allowance	The disability allowance is equal to the greater of the service retirement allowance or 60% of the member's final average salary. The disability allowance is payable over an entitlement period equal to 25% of the service credited to the member at the date of disability or five years, whichever is longer. After the disability entitlement period has expired and if the member remains disabled, he will be retired under service retirement. The service retirement allowance will be computed with service credit given for the period of disability retirement. The allowance will not be less than $6,000 per year. The service retirement allowance will not be reduced for commencement of the allowance before age 60 or the completion of 27 years of service.

Benefits Payable on Separation from Service	Any member who ceases to be in service is entitled to receive his contributions with allowable interest. A member who has completed 5 years of creditable service and leaves his contributions with the System may be continued in the membership of the System after separation from service, and file application for service retirement after the attainment of age 60.
Life Insurance	A separate Life Insurance fund has been created as of June 30, 2000 to pay benefits on behalf of deceased KTRS active and retired members.

Death Benefits

A surviving spouse of an active member with less than 10 years of service may elect to receive an annual allowance of $2,880 except that if income from other sources exceeds $6,600 per year the annual allowance will be $2,160.

A surviving spouse of an active member with 10 or more years of service may elect to receive an allowance which is the actuarial equivalent of the allowance the deceased member would have received upon retirement. The allowance will commence on the date the deceased member would have been eligible for service retirement and will be payable during the life of the spouse.

If the deceased member is survived by unmarried children under age 18 the following schedule of annual allowances applies:

Number of Children	Annual Allowance
1	$ 2,400
2	4,080
3	4,800
4 or more	5,280

The allowances are payable until a child attains age 18, or age 23 if a full-time student.

If the member has no eligible survivor, a refund of his accumulated contributions is payable to his estate.

Options

In lieu of the regular Option 1, a retirement allowance payable in the form of a life annuity with refundable balance, any member before retirement may elect to receive a reduced allowance which is actuarially equivalent to the full allowance, in one of the following forms:

Option 2. A single life annuity payable during the member's lifetime with payments for 10 years certain.

Option 3. At the death of the member his allowance is continued throughout the life of his beneficiary.

Option 3(a). At the death of the beneficiary designated by the member under Option 3, the member's benefit will revert to what would have been paid had he not selected an option.

Option 4. At the death of the member one half of his allowance is continued throughout the life of his beneficiary.

Option 4(a). At the death of the beneficiary designated by the member under Option 4, the member's benefit will revert to what would have been paid had he not selected an option.

Post-Retirement Adjustments	The retirement allowance of each retired member and of each beneficiary shall be increased by 1.50% each July 1.

3 - CONTRIBUTIONS

Member Contributions	University members contribute 7.625% of salary to the Retirement System. Non-university members contribute 9.105% of salary to the Retirement System. Member contributions are picked up by the employer.

SCHEDULE H

TABLE 1
AGE – SERVICE TABLE

Distribution of Active Members as of June 30, 2013 by Age and Service Groups

Attained Age	Completed Years of Service								
	0 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	>= 35	Total
24 & under	2,217								2,217
Total Pay	38,794,764								38,794,764
Avg. Pay	17,499								17,499
25 to 29	6,792	1,343							8,135
Total Pay	215,924,099	64,179,614							280,103,713
Avg. Pay	31,791	47,788							34,432
30 to 34	3,657	5,211	1,031						9,899
Total Pay	111,425,382	260,737,984	57,355,777						429,519,143
Avg. Pay	30,469	50,036	55,631						43,390
35 to 39	2,552	2,504	4,182	662					9,900
Total Pay	71,285,307	125,543,255	246,666,064	42,971,906					486,466,532
Avg. Pay	27,933	50,137	58,983	64,912					49,138
40 to 44	3,067	1,800	2,474	3,563	680				11,584
Total Pay	67,191,849	92,622,129	145,446,626	230,950,606	45,969,397				582,180,607
Avg. Pay	21,908	51,457	58,790	64,819	67,602				50,257
45 to 49	1,735	1,298	1,417	1,746	2,491	602			9,289
Total Pay	41,056,264	67,430,234	83,499,390	112,838,960	169,887,231	42,236,173			516,948,252
Avg. Pay	23,664	51,949	58,927	64,627	68,200	70,160			55,652
50 to 54	1,458	912	1,144	1,178	1,310	1,710	294		8,006
Total Pay	31,190,824	47,134,890	67,514,047	77,392,738	90,545,146	122,933,736	22,391,365		459,102,746
Avg. Pay	21,393	51,683	59,016	65,698	69,118	71,891	76,161		57,345
55 to 59	1,949	613	902	1,024	1,065	853	357	75	6,838
Total Pay	30,418,848	30,325,677	54,329,445	67,848,589	74,246,893	64,804,957	29,589,505	6,415,761	357,979,675
Avg. Pay	15,607	49,471	60,232	66,258	69,715	75,973	82,884	85,543	52,352
60 to 64	2,495	496	513	605	572	463	99	92	5,335
Total Pay	32,455,630	23,100,794	32,725,511	41,206,400	42,376,896	36,941,095	8,709,800	8,983,816	226,499,942
Avg. Pay	13,008	46,574	63,792	68,110	74,085	79,786	87,978	97,650	42,455
65 & over	2,287	446	197	200	193	173	51	81	3,628
Total Pay	19,301,100	14,575,089	12,694,895	14,471,923	15,031,034	14,072,640	4,570,695	7,753,657	102,471,033
Avg. Pay	8,439	32,680	64,441	72,360	77,881	81,345	89,621	95,724	28,244
Total	28,209	14,623	11,860	8,978	6,311	3,801	801	248	74,831
Total Pay	659,044,067	725,649,666	700,231,755	587,681,122	438,056,597	280,988,601	65,261,365	23,153,234	3,480,066,407
Avg. Pay	23,363	49,624	59,041	65,458	69,412	73,925	81,475	93,360	46,506

Average Age: 43.6 Average Service: 11.2

SCHEDULE H

TABLE 2

**NUMBER OF RETIRED MEMBERS AND BENEFICIARIES
AND THEIR BENEFITS BY AGE
AS OF JUNE 30, 2013**

Attained Age	Number of Members	Total Annual Benefits	Average Annual Benefits
49 & Under	818	$ 10,083,578	$ 12,327
50 - 54	1,212	43,556,202	35,937
55 - 59	4,628	186,227,130	40,239
60 - 64	10,575	402,754,864	38,086
65 - 69	11,108	395,207,502	35,579
70 - 74	7,520	253,144,670	33,663
75 - 79	4,782	147,664,869	30,879
80 & Over	6,763	170,020,277	25,140
Total	47,406	$ 1,608,659,092	$ 33,934

SCHEDULE H

TABLE 3

SCHEDULE OF RETIRANTS, BENEFICIARIES AND SURVIVORS ADDED TO AND REMOVED FROM ROLLS

	ADDED TO ROLLS		REMOVED FROM ROLLS		ROLLS AT END OF YEAR			
Fiscal Year Ending June 30	Number	Annual Allowances (in millions)	Number	Annual Allowances (in millions)	Number	Annual Allowances (in millions)	Increase In Annual Allowances	Average Annual Allowance
2004	2,126	$85.4	1,033	$17.5	35,738	$887.0	8.3%	$24,819
2005	2,644	105.1	1,036	18.9	37,346	973.1	9.7%	26,058
2006	2,266	121.1	1,115	20.0	38,497	1,074.2	10.4%	27,902
2007	2,050	82.1	1,041	20.7	39,506	1,135.6	5.7%	28,746
2008	2,183	90.6	950	19.4	40,739	1,206.8	6.3%	29,623
2009	2,351	96.2	1,040	22.7	42,050	1,280.3	6.1%	30,447
2010	2,105	93.7	1,021	21.8	43,134	1,352.2	5.6%	31,348
2011	2,133	98.9	848	17.7	44,419	1,433.4	6.0%	32,270
2012	2,513	111.2	838	19.4	46,094	1,525.2	6.4%	33,089
2013	2,303	105.7	991	22.2	47,406	1,608.7	5.5%	33,934