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# *City of Memphis*

City of Memphis Retirement System

Actuarial Valuation as of  
July 1, 2014



October 31, 2014

Mr. Brian Collins  
Director, Division of Finance  
City of Memphis  
125 North Main Street  
Memphis, Tennessee 38103

Dear Mr. Collins,

We are pleased to present this report containing the results of the July 1, 2014 actuarial valuation of the City of Memphis Retirement System ("the Plan"), pursuant to our engagement letter with the City of Memphis ("the City") dated September 26, 2013.

The City of Memphis retained PricewaterhouseCoopers LLP to perform an actuarial valuation of the Retirement System for the purpose of calculating the necessary information for accounting and reporting requirements in accordance with Government Accounting Standards Board Statement No. 67 (GASB 67), which replaced the requirements under Government Accounting Standards Board Statement No. 25 (GASB 25), and Government Accounting Standards Board Statement No. 27 (GASB 27).

It is our understanding that the City has not elected early adoption of Government Accounting Standards Board Statement No. 68 (GASB 68), which will replace GASB 27 in the next fiscal year. However, certain disclosure requirements under GASB 67 are duplicated under GASB 68; therefore, Section III of this report references both GASB 67 and GASB 68.

This valuation has been conducted in accordance with the required Actuarial Standards of Practice as issued by the American Academy of Actuaries.

Actuarial calculations under GASB 67 and GASB 27 are for purposes of fulfilling the City's financial accounting requirements. The calculations reported herein have been made on a basis consistent with our understanding of GASB 67 and GASB 27.

In preparing the results presented in this report, we have relied upon information the City of Memphis provided to us regarding plan provisions, plan participants, unaudited plan assets and benefit payments. The census data and plan asset information used in calculating the results herein were collected as of July 1, 2014. While the scope of our engagement did not call for us to perform an audit or independent verification of this information, we have reviewed this information for reasonableness. The accuracy of the results presented in this report is dependent upon the accuracy and completeness of the underlying information.

GASB 67 and GASB 27 require that each significant assumption reflect the best estimate of the Plan's future experience solely with respect to that assumption. The City of Memphis has determined and taken responsibility for the actuarial assumptions and the accounting policies and methods employed in the valuation of obligations and costs.



A range of results, different from those presented in this report could be considered reasonable. Future actuarial measurements may differ significantly from the current measurement presented in this report due to a number of factors including but not limited to: plan experience differing from that anticipated by the economic and demographic assumptions, increases or decreases expected as part of the natural operation of the methods 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), rounding conventions and changes in plan provisions or applicable law. Due to the limited scope of this report, an analysis of the potential range of such future measurements has not been performed.

This report was prepared for the internal use of the City of Memphis in connection with our actuarial valuation of the Plan and not for reliance by any other person. PwC disclaims any contractual or other responsibility or duty of care to others based upon the services or deliverables provided in connection with this report.

This report does not purport to comply with any other purposes not stated herein. Significantly different results from what is presented in this report may be needed for other purposes.

The content of this document is limited to the matters specifically addressed herein and does not address any other potential tax consequences, or the potential application of tax penalties, to any matter other than as set forth herein. Our conclusions are not binding upon any taxing authority or the courts and there is no assurance that any relevant taxing authority will not successfully assert a contrary position. In addition, no exceptions (including the reasonable cause exception) are available for any federal or state penalties imposed if any portion of a transaction is determined to lack economic substance or fails to satisfy any similar rule of law, and our advice will not protect you from any such penalties. This document supersedes all prior written or oral advice with respect to the issues addressed in this document and all such prior communications should not be relied upon by any person for any purpose.

The undersigned actuaries are each a member of the Society of Actuaries and the American Academy of Actuaries and meet the "Qualification Standards for Actuaries Issuing Statements of Actuarial Opinion in the United States" relating to pension plans. To the best of our knowledge, the individuals involved in this engagement have no relationship that may impair, or appear to impair, the objectivity of our work.

We appreciate this opportunity to be of service to the City of Memphis. We are available to answer any questions with respect to our report.

Respectfully submitted,

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**Appendix I - Development of Actuarial Value of Assets under Prior Method**

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## SECTION I - EXECUTIVE SUMMARY

### **HIGHLIGHTS OF THE ACTUARY'S REPORT**

#### **Annual Contribution Requirement**

The City's annual required contribution (ARC) for the 2014- 2015 plan year is \$79,742,000, a decrease of \$16,282,000 over the prior year. This amount is comprised of the normal cost \$30,531,000, the amortization of unfunded actuarial accrued liability \$43,648,000, and interest on both of these components \$5,563,000. Details of this calculation can be found in Section II - Funding, Exhibit D.

As shown above, there are two main components that comprise the ARC. The first component is the normal cost, which is the cost of additional benefits accruing during the current year. The employer normal cost as a percentage of anticipated payroll decreased compared to the prior year from approximately 11% to approximately 9%. Reasons for the decrease in the normal cost as a percentage of anticipated payroll are two fold. First, the employer normal cost decreased by \$2,935,000 from \$33,466,000 in 2013 to \$30,531,000 in 2014, primarily due to changes in several actuarial assumptions. Second, the anticipated payroll increased from \$304,686,000 in 2013 to \$340,532,000 in 2014, as a result of the change in both the salary scale and retirement assumptions. Details of these changes may be found on the next page.

The second component of the ARC is the amortization of the unfunded actuarial accrued liability, which is determined by the City of Memphis as the 30 year amortization of the excess of the actuarial accrued liability over the actuarial value of assets. The unfunded actuarial accrued liability includes actuarial gains and losses in both the actuarial value of assets and the actuarial accrued liability. Although the employer contributions during the prior plan year were less than the prior year ARC, the unfunded actuarial accrued liability decreased by \$155,036,000 (from \$709,201,000 in 2013 to \$554,165,000 in 2014). A reconciliation of the unfunded actuarial accrued liability may be found Section II - Funding, Exhibit C.

The method for determining the actuarial value of assets used to determine the ARC was updated as of July 1, 2014 in order to comply with The Public Employee Defined Benefit Financial Security Act of 2014. The new method is an actuarial value that "smoothes" fluctuations in the market value over a 5 year period, while ensuring that the actuarial value stays within a 10% corridor of the market value of assets. The prior year method was a rolling actuarial value subject to a 10% corridor around market value of assets. The development of the actuarial value of assets can be found in Section IV - Assets, Exhibit C. The impact of this change is an increase of \$24,263,000 in the actuarial value of assets.



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## SECTION I - EXECUTIVE SUMMARY

### **HIGHLIGHTS OF THE ACTUARY'S REPORT**

#### **Changes in Assumptions and Methods from Prior Year**

An assumption study was performed in May of 2014 resulting in an update to several demographic assumptions. Details are described below.

The **retirement assumption** for General Employees changed from 100% at earliest eligibility to a graded table that varies by age and gender. The retirement rates for Police and Fire Employees were changed from 100% at earliest eligibility to a graded table that varies by age only.

The **termination rate** assumption changed from a sex-distinct age-based table for male General Employees and male Police and Fire Employees to a select and ultimate table that varies by age and gender.

The **marital assumptions** for General Employees were changed from husbands assumed to be 5 years older than their wives to husbands assumed to be 3 years older than their wives. The marital assumption for Police and Fire was changed from 90% assumed to be married to 80% assumed to be married and from husbands assumed to be 5 years older than their wives to husbands assumed to be 3 years older than their wives.

The **mortality table** for General Employees was changed from the Fully Generational RP-2000 Combined Mortality Table for males and females to the Fully Generational RP-2014 Mortality Table for males and females with 1 year set forward. The mortality table for Police and Fire was changed from the Fully Generational RP-2000 Combined Mortality Table with Blue Collar adjustment for males and females to the Fully Generational RP-2014 Mortality Table with Blue Collar adjustment for males and females with 1 year set forward. In addition, the mortality table for disabled participants was changed to the Fully Generational RP-2014 Disabled Table with 3 year set back.

The **salary increase assumption** changed from flat 5.0% for all employees to a scale that varies by age and service. The weighted average salary increase under the new salary scale is 4.25%.

The **asset method** for funding purposes changed from a rolling actuarial value with a 10% corridor to an actuarial value that smoothes asset gains and losses over a 5 year period with a 10% corridor. The impact of this change is an increase of \$24,263,000 to the actuarial value of assets, or approximately a 3.74% decrease in the unfunded actuarial accrued liability. See Appendix 1 for a development of what the 2014 actuarial value of assets would have been using last year's method.

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## SECTION I - EXECUTIVE SUMMARY

### **HIGHLIGHTS OF THE ACTUARY'S REPORT**

#### **Changes in Accounting Guidance**

Information in found in Section III - Accounting is prepared in accordance with GASB 27 and GASB 67, which replaced the requirements under GASB 25.

It is our understanding that the City has not elected early adoption of GASB 68, which will replace GASB 27 for the next fiscal year. However, certain disclosure requirements under GASB 67 are duplicated under GASB 68; therefore, Section III of this report references both GASB 67 and GASB 68.

#### **Plan Experience**

The number of active employees decreased from 6,020 in 2013 to 5,756 in 2014. Despite this decrease in active headcount, the anticipated payroll increased from \$304,686,000 in 2013 to \$340,532,000 in 2014. This is due to the change in retirement assumption, as anticipated compensation for active participants who are assumed to retire in the next year are not included in the anticipated total payroll. As a result of the experience study performed in May of 2014, fewer active participants are assumed to retire immediately, thus increasing the anticipated payroll between 2013 and 2014.

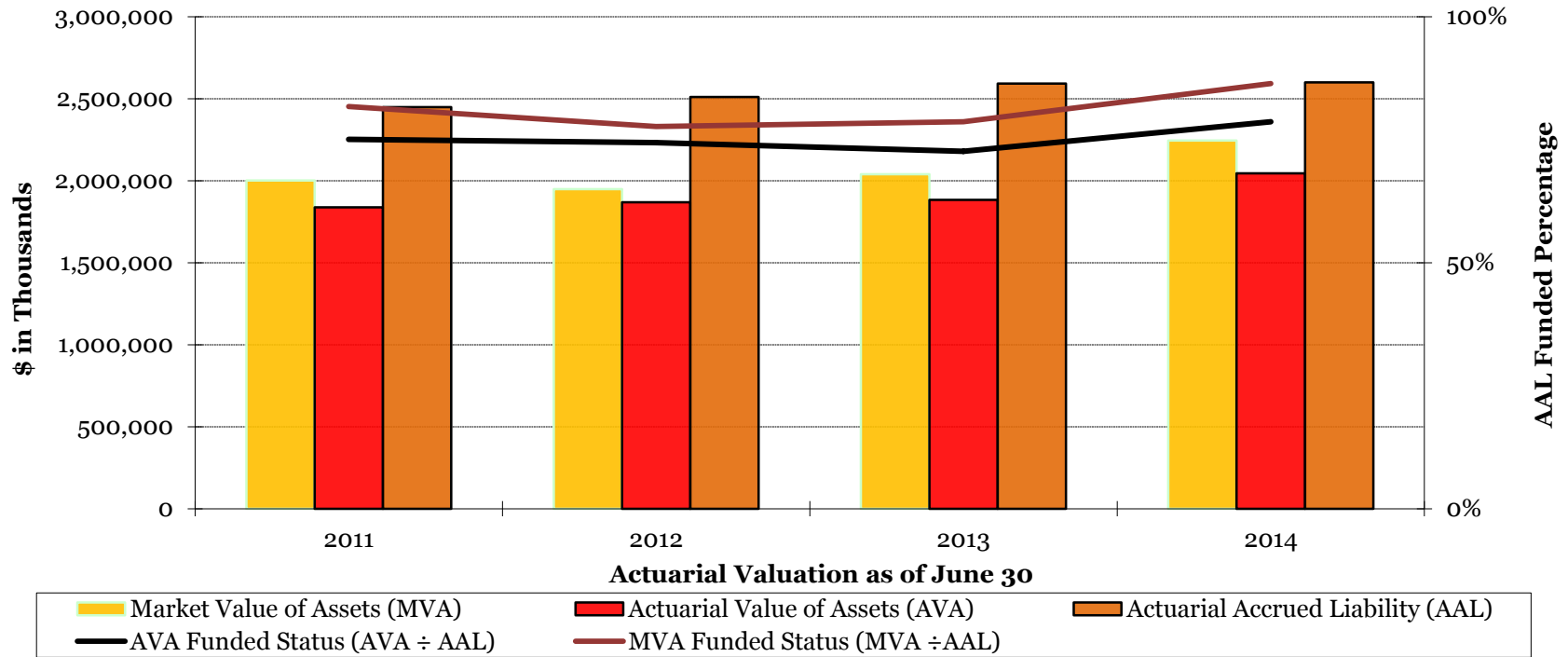
The number of terminated vested employees increased from 168 in 2013 to 646 in 2014. This is due to a refinement in the way the City tracks the terminated vested participants, and includes all terminated vested participants as of the valuation date. Despite this large increase, the terminated vested liability only increased by \$676,000 (from \$3,526,000 in 2013 to \$4,202,000 in 2014). The majority of newly reported terminated vested participants have relatively small liabilities amounting in aggregate to \$1,766,000 with an average balance of \$3,450.



**SECTION I - EXECUTIVE SUMMARY**

**HISTORICAL SUMMARY**

**4 Year History of Funded Status (in 000's)**



**Actuarial Valuation as of June 30:**

	<b><u>2011</u></b>	<b><u>2012</u></b>	<b><u>2013</u></b>	<b><u>2014</u></b>
Actuarial Accrued Liability (AAL)	\$2,447,974	\$2,509,930	\$2,592,987	\$2,599,070
Actuarial Value of Assets (AVA)	\$1,838,424	\$1,867,934	\$1,883,786	\$2,044,905
Market Value of Assets (MVA)	\$2,001,504	\$1,949,085	\$2,040,069	\$2,245,158
Unfunded Liability (AAL - AVA)	\$609,550	\$641,996	\$709,201	\$554,165
AVA Funded Status (AVA ÷ AAL)	75.1%	74.4%	72.6%	78.7%
MVA Funded Status (MVA ÷ AAL)	81.8%	77.7%	78.7%	86.4%

**SECTION I - EXECUTIVE SUMMARY**

**HISTORICAL SUMMARY (CONTINUED)**

**Summary of Valuation Results (Continued)**

<b><u>Valuation Date</u></b>	<b><u>June 30, 2011</u></b>	<b><u>June 30, 2012</u></b>	<b><u>June 30, 2013</u></b>	<b><u>June 30, 2014</u></b>
1. Annual Funding:				
a. Annual Required Contribution	\$ 89,006,000	\$ 90,363,000	\$ 96,024,000	\$ 79,742,000
b. Percent of Anticipated Payroll	28.1%	30.3%	31.5%	23.4%
2. Participation at beginning of plan year:				
a. Anticipated payroll	\$ 316,434,000	\$ 298,250,000	\$ 304,686,000	\$ 340,532,000
b. Annual benefits in pay status	\$ 146,178,000	\$ 151,899,000	\$ 155,505,000	\$ 161,559,000
c. Average attained age for active participants	42.6	43.0	44.0	43.9
3. GASB 27 Information				
Fiscal Year Ending	<b><u>June 30, 2011</u></b>	<b><u>June 30, 2012</u></b>	<b><u>June 30, 2013</u></b>	<b><u>June 30, 2014</u></b>
a. Annual Pension Cost (APC)	\$ 79,883,000	\$ 88,291,000	\$ 88,988,000	\$ 93,972,000
b. Employer contribution	\$ 20,132,000	\$ 20,108,000	\$ 18,968,000	\$ 19,440,000
c. Percent of APC contributed	25.2%	22.8%	21.3%	20.7%
d. End of Year Net Pension Obligation (Asset)	\$ 73,942,000	\$ 142,125,000	\$ 212,145,000	\$ 286,677,000

SECTION I - EXECUTIVE SUMMARY

**HISTORICAL SUMMARY (CONTINUED)**

**Summary of Valuation Results (Continued)**

	<u>June 30, 2011</u>	<u>June 30, 2012</u>	<u>June 30, 2013</u>	<u>June 30, 2014</u>
Census Information				
Active				
Number	6,273	6,093	6,020	5,756
Average Age	42.6	42.4	44.0	43.9
Average Years of Service	11.0	11.3	11.2	12.0
Anticipated Payroll <sup>1</sup>	\$ 316,434,000	\$ 298,250,000	\$ 304,686,000	\$ 340,532,000
Actual Covered Payroll	N/A	N/A	N/A	\$ 324,000,000
Terminated Vested				
Number	81	173	168	646
Retiree/Beneficiary/Disabled				
Number	4,570	4,670	4,782	4,892
Annual Benefits Payable	\$ 146,178,000	\$ 151,860,000	\$ 155,505,000	\$ 161,559,000

<sup>1</sup> The increase in anticipated payroll between 2013 and 2014, despite the decrease in number of actives, is the result of the change in the retirement assumption.

SECTION I - EXECUTIVE SUMMARY

**HISTORICAL SUMMARY (CONTINUED)**

**Summary of Valuation Results (Continued)**

	<u>June 30, 2011</u>	<u>June 30, 2012</u>	<u>June 30, 2013</u>	<u>June 30, 2014</u>
<b>Actuarial Accrued Liability (AAL)</b>				
Active Participants	\$ 996,305,000	\$ 982,205,000	\$ 1,023,966,000	\$ 935,126,000
Terminated Vested Participants	1,600,000	5,301,000	3,526,000	4,202,000
Retiree/Beneficiary/Disabled Participants	<u>1,450,069,000</u>	<u>1,522,424,000</u>	<u>1,565,495,000</u>	<u>1,659,742,000</u>
Total	\$ 2,447,974,000	\$ 2,509,930,000	\$ 2,592,987,000	\$ 2,599,070,000
 <b>Actuarial Value of Assets (AVA)</b>	 \$ 1,838,424,000	 \$ 1,867,934,000	 \$ 1,883,786,000	 \$ 2,044,905,000
 <b>Market Value of Assets (MVA)</b>	 \$ 2,001,504,000	 \$ 1,949,085,000	 \$ 2,040,069,000	 \$ 2,245,158,000
 <b>Unfunded Accrued Liability: AAL - AVA</b>	 \$ 609,550,000	 \$ 641,996,000	 \$ 709,201,000	 \$ 554,165,000
 <b>Funded Percentage: AVA ÷ AAL</b>	 75.1%	 74.4%	 72.6%	 78.7%
 <b>Summary of Assumptions</b>				
Valuation Interest Rate	7.5%	7.5%	7.5%	7.5%
Salary Scale	5.0%	5.0%	5.0%	4.25%
Cost-of-Living Assumption	N/A	N/A	N/A	N/A

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SECTION II - FUNDING

**FUNDING**

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SECTION II - FUNDING

**A. Development of Funded Status**

	<u>General Employees</u>	<u>Police and Fire</u>	<u>Total</u>
1. Actuarial Accrued Liability			
a. Active Participants	\$ 221,794,000	\$ 713,332,000	\$ 935,126,000
b. Terminated Vested Participants	2,341,000	1,861,000	4,202,000
c. Retiree/Beneficiary/Disabled Participants	<u>485,104,000</u>	<u>1,174,638,000</u>	<u>1,659,742,000</u>
d. Total: (1)(a) + (1)(b) + (1)(c)	\$ 709,239,000	\$ 1,889,831,000	\$ 2,599,070,000
2. Actuarial Value of Assets <sup>1</sup>	\$ 558,017,000	\$ 1,486,888,000	\$ 2,044,905,000
3. Unfunded Actuarial Accrued Liability: (1)(d) - (2)	\$ 151,222,000	\$ 402,943,000	\$ 554,165,000
4. Funded Percentage: (2) ÷ (1)(d)	78.7%	78.7%	78.7%

<sup>1</sup> The actuarial value of assets are allocated in proportion to the actuarial accrued liability of General employees and Police and Fire employees.

SECTION II - FUNDING

**B. Actuarial Accrued Liability Reconciliation**

1. July 1, 2013 Actuarial Accrued Liability	\$ 2,592,987,000	
2. Normal Cost <sup>1</sup>	55,409,000	
3. Actual Benefit Payments	170,833,000	
4. Interest of 7.5% on (1) + (2) - (3) ÷ 2	<u>192,223,000</u>	
5. Expected July 1, 2014 Actuarial Accrued Liability: (1) + (2) - (3) + (4)	\$ 2,669,786,000	
	<u>Dollar Change in Liability</u>	<u>Percent Change in Liability</u>
6. (Gain)/Loss Components		
a. Change in Retirement Assumption <sup>2</sup>	\$ (104,798,000)	(3.9%)
b. Change in Termination Assumption <sup>2</sup>	(5,025,000)	(0.2%)
c. Change in Marital Assumptions <sup>2</sup>	(10,296,000)	(0.4%)
d. Change in Salary Scale Assumption <sup>2</sup>	(37,091,000)	(1.4%)
e. Change in Mortality Assumptions <sup>2</sup>	28,249,000	1.1%
f. Census Experience	37,333,000	1.4%
g. Salary Experience	<u>20,912,000</u>	<u>0.8%</u>
h. Total	\$ (70,716,000)	(2.6%)
7. July 1, 2014 Actuarial Accrued Liability: (5) + (6)(h)	\$ 2,599,070,000	

<sup>1</sup> Includes both the employer and employee normal cost.

<sup>2</sup> All assumption changes are the result of an experience study conducted May 2014. A summary of the assumption changes may be found in Section VI.

SECTION II - FUNDING

**C. Unfunded Actuarial Accrued Liability Reconciliation**

1.	Expected Unfunded Actuarial Accrued Liability	
a.	Unfunded Actuarial Accrued Liability at July 1, 2013	\$ 709,201,000
b.	Employer Normal Cost	33,466,000
c.	Expected Funding of Annual Required Contribution (ARC)	<u>96,024,000</u>
d.	Expected Unfunded Actuarial Accrued Liability at July 1, 2014 [(a) + (b)] × 1.075 - (c)	\$ 702,343,000
2.	Change in Unfunded Actuarial Accrued Liability (Decrease) / Increase	
a.	Change Due to Not Funding the Full ARC <sup>1</sup>	\$ 74,187,000
b.	Change due to Asset Experience <sup>2</sup>	(127,385,000)
c.	Change in Method - Actuarial Value of Assets	(24,263,000)
d.	Change in Plan Provisions	-
e.	Change in Assumptions	(128,962,000)
f.	Plan Experience	<u>58,245,000</u>
g.	Change in Unfunded Actuarial Accrued Liability:	\$ (148,178,000)
3.	Unfunded Actuarial Accrued Liability at July 1, 2014: (1)(d) + (2)(g)	\$ 554,165,000

<sup>1</sup> The ARC for the prior year was \$96,024,000 and the actual City contribution was \$19,440,000

<sup>2</sup> The assumed rate of return on assets for the period was 7.5%, but the actual rate of return over the period was 17.4%. Due to the favorable asset return, the preliminary actuarial value of assets of \$1,893,079,000 was limited to 90% of the market value of assets of \$2,020,642,000. See Appendix 1 for the development of the actuarial value of assets under the prior asset method.



SECTION II - FUNDING

**D. Development of Annual Required Contribution**

Development of annual required contribution for the plan year ending June 30, 2015 and the fiscal year ending June 30, 2015.

	<u>General Employees</u>	<u>Police and Fire</u>	<u>Total</u>
1. Annual Anticipated Payroll	\$ 92,128,000	\$ 248,404,000	\$ 340,532,000
2. Annual Required Contribution (ARC):			
a. Total Normal Cost as of July 1, 2014	\$ 14,781,000	\$ 39,711,000	\$ 54,492,000
b. Estimated Employee Contributions	6,584,000	17,377,000	23,961,000
c. Employer Normal Cost as of July 1, 2014	8,197,000	22,334,000	30,531,000
d. Unfunded Actuarial Liability (UAL)	151,222,000	402,943,000	554,165,000
e. Payment to amortize UAL over 30 years	11,911,000	31,737,000	43,648,000
f. Interest: [(c) + (e)] × 7.5%	1,508,000	4,055,000	5,563,000
g. Annual Required Contribution: (c) + (e) + (f)	21,616,000	58,126,000	79,742,000
h. Percent of Annual Covered Payroll: (g) ÷ (1)	23.46%	23.40%	23.42%

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SECTION III - ACCOUNTING

**ACCOUNTING**

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SECTION III - ACCOUNTING

**NOTES TO THE FINANCIAL STATEMENTS UNDER GASB 67 AND 68**

**A. Selected Notes to the Financial Statements under GASB 67 and 68**

1. The Plan is a single-employer plan for GASB accounting purposes.
2. Significant actuarial assumptions and other inputs used to measure the total pension liability:
  - a. Measurement Date                      July 1, 2014
  - b. Valuation Date                         July 1, 2014
  - c. Investment Yield                        7.5%
  - d. Future Salary Increases                Scale that varies by age and service with a weighted average of 4.25% per year
  - e. Cost-of-Living Increases                N/A
  - f. Mortality Assumption                  General: Fully Generational RP-2014 Mortality Table for males and females with 1 year set forward  
  
Police and Fire: Fully Generational RP-2014 Mortality Table with Blue Collar adjustment for males and females and a 1 year set forward  
  
Disabled: Fully Generational RP-2014 Disabled Mortality Table with 3 year set back
  - g. Experience Study                        May 1, 2014 experience study based on 10 years of census data (between 2003-2012)

SECTION III - ACCOUNTING

**NOTES TO THE FINANCIAL STATEMENTS UNDER GASB 67 AND 68**

**A. Selected Notes to the Financial Statements under GASB 67 and 68 (Cont.)**

2. Significant actuarial assumptions and other inputs used to measure the total pension liability (cont.):

h. Discount Rate                      The discount rate used to measure the total pension liability was 7.5% as of July 1, 2014, and is equal to the long-term expected return on plan investments. The projection of cash flows used to determine the discount rate assumed that City contributions would be made at the actuarially calculated amount computed in accordance with the current funding policy adopted by the City, which requires payment of the normal cost and amortization of the unfunded actuarially accrued liability in level dollar installments over 30 years utilizing a closed period approach. Pursuant to The Public Employee Defined Benefit Financial Security Act of 2014, the City will phase into funding 100% of the actuarially calculated amount over a 5 year period beginning with the fiscal year beginning July 1, 2015. Based on this assumption, the pension plan's fiduciary net position was projected to be available to make all projected future benefit payments of current plan members.

i. Discount Rate Sensitivity	<u>1% Decrease (6.5%)</u>	<u>Current Rate (7.5%)</u>	<u>1% Increase (8.5%)</u>
Net Pension Liability (000's)	\$ 656,044	\$ 353,912	\$ 102,044

j. DROP Program                      Total accumulated DROP balances as of June 30, 2014: \$12,372,000

SECTION III - ACCOUNTING

**NOTES TO THE FINANCIAL STATEMENTS UNDER GASB 67 AND 68**

**A. Selected Notes to the Financial Statements under GASB 67 and 68 (Cont.)**

3. Classes of plan members covered:

a. Retired members, beneficiaries and disabled members receiving benefits	4,892
b. Terminated vested plan members entitled to but not yet receiving benefits	646
c. Active plan members	5,756
d. Total membership	<u>11,294</u>

4. The components of the Net Pension Liability (000's) for the plan as of July 1, 2014 are as follows:

a. Total Pension Liability	\$ 2,599,070
b. Plan Fiduciary Net Position	<u>2,245,158</u>
c. Net Pension Liability	\$ 353,912
d. Plan Fiduciary Net Position as a Percentage of the Total Pension Liability	86.4%

SECTION III - ACCOUNTING

**REQUIRED SUPPLEMENTARY INFORMATION UNDER GASB 67 AND 68**

**B. Schedule of Changes in the Net Pension Liability and Related Ratios under GASB 67 and 68 <sup>1</sup>**

**Total Pension Liability (ooo's)**

(1) Year Ending June 30	(2) Beginning Total Pension Liability	(3) Service Cost	(4) Interest <sup>2</sup>	(5) Experience (Gains)/ Losses	(6) Assumption Changes <sup>3</sup>	(7) Changes of Benefit Terms	(8) Benefit Payments	(9) Ending Total Pension Liability
2014	\$ 2,592,987	\$ 55,409	\$ 192,223	\$ 58,245	\$ (128,961)	\$ -	\$ (170,833)	\$ 2,599,070

<sup>1</sup> This schedule is prepared to illustrate the requirement to show information regarding the Net Pension Liability and Related Ratios for 10 years. The information presented above is for those years for which it is available.

<sup>2</sup> For the current fiscal year, includes interest at 7.5% on the beginning-of-year Total Pension Liability and service cost offset by interest on benefit payments.

<sup>3</sup> The sources of actuarial gain or loss due to changes in assumptions are summarized in Section II - B of this report.

SECTION III - ACCOUNTING

**REQUIRED SUPPLEMENTARY INFORMATION UNDER GASB 67 AND 68**

**B. Schedule of Changes in the Net Pension Liability and Related Ratios under GASB 67 and 68 (cont.) <sup>1</sup>**

**Plan Fiduciary Net Position (ooo's)**

(1) Year Ending June 30	(2) Beginning Fiduciary Net Position <sup>2</sup>	(3) Employer Contribution	(4) Employee Contribution	(5) Investment Return	(6) Benefit Payments	(7) Administrative Expenses	(8) Investment Expenses	(9) Ending Fiduciary Net Position <sup>2</sup>
2014	\$ 2,040,069	\$ 19,440	\$ 24,173	\$ 342,614	\$ (170,833)	\$ (1,478)	\$ (8,827)	\$ 2,245,158

<sup>1</sup> This schedule is prepared to illustrate the requirement to show information regarding the Net Pension Liability and Related Ratios for 10 years. The information presented above is for those years for which it is available.

<sup>2</sup> Equal to the market value of assets.

SECTION III - ACCOUNTING

**REQUIRED SUPPLEMENTARY INFORMATION UNDER GASB 67 AND 68**

**B. Schedule of Changes in the Net Pension Liability and Related Ratios under GASB 67 and 68 (cont.) <sup>1</sup>**

**Net Pension Liability (ooo's)**

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Year Ending June 30	Total Pension Liability	Net Fiduciary Position	Net Pension Liability	Fiduciary Net Position as % of Total Pension Liability	Actual Covered Employee Payroll	Net Pension Liability as a Percentage of Covered Payroll
			(2) - (3)	(3) ÷ (2)		(4) ÷ (6)
2014	\$ 2,599,070	\$ 2,245,158	\$ 353,912	86.4%	\$ 324,000	109.2%

<sup>1</sup> This schedule is prepared to illustrate the requirement to show information regarding the Net Pension Liability and Related Ratios for 10 years. The information presented above is for those years for which it is available.



SECTION III - ACCOUNTING

**REQUIRED SUPPLEMENTARY INFORMATION UNDER GASB 67 AND 68**

**C. Schedule of Contributions under GASB 67 and 68 (000's) <sup>1</sup>**

(1)	(2)	(3)	(4)	(5)	(6)
Year Ending June 30	Actuarially Determined Contribution <sup>2</sup>	Actual Employer Contributions	Contribution Excess/(Deficiency) (3) - (2)	Actual Covered Employee Payroll	Contributions as a Percentage of Covered Payroll (3) ÷ (5)
2014	\$ 96,024	\$ 19,440	\$ (76,584)	\$ 324,000	6.0%

<sup>1</sup> This schedule is prepared to illustrate the requirement to show information regarding the Net Pension Liability and Related Ratios for 10 years. The information presented above is for those years for which it is available.

<sup>2</sup> The actuarially determined contribution is for the fiscal year ending June 30, 2014 and is based on a discount rate assumption of 7.5%.

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SECTION III - ACCOUNTING

**REQUIRED SUPPLEMENTARY INFORMATION UNDER GASB 27**

**D. Assumptions and Methods Under GASB 27**

Under the Governmental Accounting Standards Board (GASB) Statement No. 27, as amended by GASB No. 50, certain information about the plan is required to be disclosed. The information presented in the required supplementary schedules was determined as part of the actuarial valuations at the dates indicated. Additional information as of the latest actuarial valuation follows:

- |                              |  |
|------------------------------|--|
| 1. Valuation Date            | July 1, 2014   |
| 2. Actuarial Cost Method     | Entry Age Normal - Level Percent of Pay  |
| 3. Amortization Method       | Level Dollar   |
| 4. Amortization Period       | 30 Years, Closed   |
| 5. Actuarial Value of Assets | Actuarial Value that smoothes asset gains and losses over a period of 5 years or less, and subject to 10% Corridor around Market Value of Assets |
| 6. Actuarial Assumptions:    |  |
| a. Investment Rate of Return | 7.50%  |
| b. Future Salary Increases   | 4.25%  |
| c. Cost-of-Living Increases  | N/A  |

SECTION III - ACCOUNTING

**REQUIRED SUPPLEMENTARY INFORMATION UNDER GASB 27**

**E. Schedule of Funding Progress under GASB 27 (000's)**

(1) Actuarial Valuation Date July 1	(2) Actuarial Value of Assets	(3) Actuarial Accrued Liability (AAL)	(4) Unfunded Actuarial Accrued Liability (UAAL) <u>(3) - (2)</u>	(5) AAL Funded Ratio <u>(2) ÷ (3)</u>	(6) Covered Payroll	(7) UAAL as a % of Payroll <u>(4) ÷ (6)</u>
2009	\$ 1,773,457	\$ 2,222,984	\$ 449,527	79.8%	\$ 296,134	151.8%
2010	1,805,071	2,336,075	531,004	77.3%	308,889	171.9%
2011	1,838,424	2,447,974	609,550	75.1%	316,434	192.6%
2012	1,867,934	2,509,930	641,996	74.4%	298,250	215.3%
2013	1,883,786	2,592,987	709,201	72.6%	304,686	232.8%
2014	2,044,905	2,599,070	554,165	78.7%	340,532	162.7%

**F. Schedule of Employer Contributions under GASB 27 (000's)**

(1) Year Ending June 30	(2) Annual Required Contribution (ARC)	(3) Actual Employer Contribution	(4) Percentage of ARC <u>(3) ÷ (2)</u>
2009	\$ 21,208	\$ 16,172	76.3%
2010	71,447	17,419	24.4%
2011	80,021	20,132	25.2%
2012	89,006	20,108	22.6%
2013	90,363	18,968	21.0%
2014	96,024	19,440	20.2%

SECTION III - ACCOUNTING

**REQUIRED SUPPLEMENTARY INFORMATION UNDER GASB 27**

**G. Development of Net Pension Obligation (NPO) under GASB 27 (000's)**

Fiscal Year Ending June 30	2013	2014
1. Annual required contribution	\$ 90,363	\$ 96,024
2. Net pension obligation (asset) beginning of year	142,125	212,145
3. Interest on net pension obligation (asset): (2) × 7.5%	10,659	15,911
4. Amortization period	30	30
5. Amortization factor	11.81039	11.81039
6. Adjustment to annual required contribution: (2) ÷ (5)	12,034	17,963
7. Annual Pension Cost (APC): (1) + (3) -(6)	88,988	93,972
8. Employer contribution made	(18,968)	(19,440)
9. Increase (decrease) in net pension obligation: (7) + (8)	70,020	74,532
10. Net pension obligation(asset) end of year: (2) + (9)	212,145	286,677

**H. Three-Year Trend Information under GASB 27 (000's)**

(1) Year Ending June 30	(2) Annual Pension Cost (APC)	(3) Actual Employer Contribution	(4) Percent of APC  (3) ÷ (2)	(5) Net Pension Obligation (Asset)
2012	\$ 88,291	\$ 20,108	22.8%	\$ 142,125
2013	88,988	18,968	21.3%	212,145
2014	93,972	19,440	20.7%	286,677

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SECTION IV - ASSETS

**ASSETS**

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B. Reconciliation of Market Value of Assets and Investment Return	24
C. Development of Actuarial Value of Assets for Funding Purposes	25

SECTION IV - ASSETS

<b>A. Market Value of Assets</b>	<b>Market Value June 30, 2013</b>	<b>Market Value June 30, 2014</b>
1607 Capital Partners	\$ 108,273,642	\$ 138,571,589
Acadian EM Equity II	87,751,316	100,558,982
Barrow, Hanley, et al	89,406,052	83,180,245
BlackRock Granite Property Fund	29,882,770	32,828,993
Cash Management Account (In-House)	6,529,944	21,275,205
Cornerstone	6,141,502	8,154,426
Fidelity Real Estate Growth III Fund	24,129,256	15,349,923
Herndon	97,662,669	99,870,281
Long Wharf Real Estate Partners	-	8,820,168
Mackay Shields	196,308,221	205,141,816
Marathon Asset Management	122,615,262	122,319,095
Navellier & Associates	86,495,334	104,525,523
Nicholas Investment Partners	28,014,435	24,300,418
Northern Trust	85,518,509	107,084,318
Paradigm Small Cap	56,352,852	40,522,375
PIMCO	188,571,569	196,136,219
Platte River	24,557,275	30,074,010
Principal Global Investors	84,518,318	93,581,094
Prudential Core Conserv Bond	164,772,127	208,031,886
Rhumblin S&P 500	189,714,510	182,653,222
Rowe Price Fleming	139	139
RREEF America REIT II	11,439,596	12,358,308
RREEF Real Estate Securities Commingled Fund	29,612,437	33,200,255
Smith Graham	151,928,244	193,733,390
SouthernSun	48,621,015	44,021,166
Strategic Global Advisors	24,227,606	31,562,613
Winslow Capital Management	97,024,725	107,302,374
<b>Total</b>	<b>\$ 2,040,069,000</b>	<b>\$ 2,245,158,000</b>

SECTION IV - ASSETS

**B. Reconciliation of Market Value of Assets and Investment Return**

1.	Market Value of Assets at July 1, 2013	\$ 2,040,069,000
2.	Contributions	
a.	Employer Contributions	\$ 19,440,000
b.	Employee Contributions	<u>24,173,000</u>
c.	Total	\$ 43,613,000
3.	Benefit Payments in 2013 - 2014	\$ 170,833,000
4.	Expenses	
a.	Investment Fees	\$ 8,827,000
b.	Administrative Fees	<u>1,478,000</u>
c.	Total	\$ 10,305,000
5.	Interest and Dividend Income	\$ 48,734,000
6.	Unrealized Gain/(Loss)	\$ 262,674,000
7.	Net Realized Gain/(Loss)	\$ 29,120,000
8.	Other Revenue <sup>1</sup>	<u>\$ 2,086,000</u>
9.	Total Income: (5) + (6) + (7) + (8)	\$ 342,614,000
10.	Market Value of Assets at July 1, 2014: (1) + (2) - (3) - (4) + (9)	\$ 2,245,158,000
11.	Investment Return: $[2 \times (9)] \div [(1) + (10) - (9)]$	17.4%

<sup>1</sup> Does not reflect adjustment to DROP Benefit Payments, as the amount is immaterial, per the City.

SECTION IV - ASSETS

**C. Development of Actuarial Value of Assets for Funding Purposes**

1.	Market Value of Assets (MVA) at July 1, 2014		\$ 2,245,158,000
2.	Development of Expected Market Value of Assets at July 1, 2014:		
	a. MVA at July 1, 2013:		\$ 2,040,069,000
	b. Expected Investment Earnings at July 1, 2013 MVA:		153,005,000
	c. Contributions with half a year of interest at 7.5%:		45,248,000
	d. Benefit Payments with half a year of interest at 7.5%:		<u>(177,239,000)</u>
	e. Expected MVA at July 1, 2014: (2)(a) + (2)(b) + (2)(c) - (2)(d)		\$ 2,061,083,000
3.	Gains/(Losses) at July 1, 2014: (1) - (2)(e)		\$ 184,075,000
4.	Asset Gains/(Losses)	<u>Gains/(Losses)</u>	<u>% Not Yet Recognized</u>
	a. 2014 Asset Gain (Loss):	\$ 184,075,000	80%
	b. 2013 Asset Gain (Loss):	69,045,000	60%
	c. 2012 Asset Gain (Loss):	(94,160,000)	40%
	d. 2011 Asset Gain (Loss):	246,152,000	20%
			<u>Gains/(Losses) Not Yet Recognized</u>
5.	Total Unrecognized Asset Gains/(Losses): sum of (4)(a) to (4)(d)		\$ 200,253,000
6.	Actuarial Value of Assets Current for Year Prior to Corridor: (1) - (5)		\$ 2,044,905,000
7.	90% of Market Value of Assets: (1) × 90%		\$ 2,020,642,000
8.	110% of Market Value of Assets: (1) × 110%		\$ 2,469,674,000
9.	Actuarial Value of Assets at July 1, 2014: (6), but not less than (7) or greater than (8)		\$ 2,044,905,000



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SECTION V - CENSUS DATA

**CENSUS DATA**

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D. Distribution of Retired Members, Beneficiaries, and Disabled Members by Age and Number of Years Retired	29
E. Flow of Lives from June 30, 2013 to June 30, 2014	30

SECTION V - CENSUS DATA

**A. Census Information**

	<b>June 30, 2013</b>	<b>June 30, 2014</b>
1. Active		
a. Number	6,020	5,756
b. Average Age	44.0	43.9
c. Average Years of Service	11.2	12.0
d. Covered Payroll of Actives <sup>1</sup>	\$ 304,686,000	\$ 340,532,000
2. Terminated Vested		
a. Number	168	646
4. Retiree and Beneficiary		
a. Number	4,147	4,239
b. Annual Benefits Payable	\$ 138,892,000	\$ 144,189,000
5. Disabled		
a. Number	635	653
b. Annual Benefits Payable	\$ 16,613,000	\$ 17,370,000

<sup>1</sup> The increase in anticipated payroll between 2013 and 2014, despite the decrease in number of actives, is the result of the change in the retirement assumption.

SECTION V - CENSUS DATA

**B. Distribution of Active Members by Age and Service**

Attained Age	Distribution of Active Members by Age and Service as of June 30, 2014										Total
	Under 1 year	1 to 4 years	5 to 9 years	10 to 14 years	15 to 19 years	20 to 24 years	25 to 29 years	30 to 34 years	35 to 39 years	Over 40 years	
<25	11	39	3								53
25-29	31	283	146	4							464
30-34	31	250	311	105	1						698
35-39	26	142	264	282	83						797
40-44	20	100	207	290	417	80	7				1,121
45-49	24	86	124	209	326	220	73				1,062
50-54	20	65	75	137	185	178	99	14	2		775
55-59	11	57	68	86	108	75	53	12	2		472
60-64	8	27	27	63	43	30	16	4	2	4	224
65-69	2	11	16	17	16	11	2	1	1		77
70&Up	1	1	2		5	1	3				13
Total	185	1,061	1,243	1,193	1,184	595	253	31	7	4	5,756

SECTION V - CENSUS DATA

**C. Distribution of Terminated Vested Members by Age and Service**

Attained Age	Distribution of Terminated Vested Members by Age and Service as of June 30, 2014							Total
	Under 5 years	5 to 9 years	10 to 14 years	15 to 19 years	20 to 24 years	25 to 29 years	Over 30 years	
<25	8	3						11
25-29	105	49						154
30-34	69	71						140
35-39	49	47	10					106
40-44	31	45	10	3				89
45-49	21	16	10	6	1	5		59
50-54	14	15	6	4	1			40
55-59	6	11	5					22
60-64	7	4	3	2				16
65-69		6		1				7
70&Up		2						2
Total	310	269	44	16	2	5		646

SECTION V - CENSUS DATA

**D. Distribution of Retired Members, Beneficiaries, and Disabled Members by Age and Number of Years Retired**

Attained Age	Distribution of Retired Members, Beneficiaries, and Disabled Members by Age and Number of Years Retired as of June 30, 2014							Total
	Under 5 years	5 to 9 years	10 to 14 years	15 to 19 years	20 to 24 years	25 to 29 years	Over 30 years	
<40	1	6	21	7	3	3	4	45
40-44			20	21	4	5	3	53
45-49		2	11	27	23	89	3	155
50-54	1	1	16	13	24	206	76	337
55-59	2	2	10	22	25	135	356	552
60-64		5	18	29	43	100	605	800
65-69		5	12	21	27	64	802	931
70-74		1	6	12	27	30	666	742
75-79			4	5	13	24	525	571
80-84				2	2	13	382	399
85-89					2	5	199	206
90&Up							101	101
Total	4	22	118	159	193	674	3,722	4,892

SECTION V - CENSUS DATA

**E. Flow of Lives from June 30, 2013 to June 30, 2014**

	<u>Actives</u>	<u>Terminated Vested</u>	<u>Disabled</u>	<u>Retired <sup>1</sup></u>	<u>DROP</u>	<u>Total</u>
June 30, 2013	6,020	168	635	3,837	310	10,970
New Entrants:	190	-	-	-	-	190
Rehires:	32	(3)	(1)	(1)		27
DROP:	(120)			-	120	-
Vested Terminations:	(65)	65		-		-
Terminations:	(198)	(91)		-		(289)
Retirements:	(69)			203	(134)	-
Disablements:	(17)		17	-		-
Death with Beneficiary:	(4)			4		-
Death without Beneficiary:	(13)		(25)	(86)		(124)
Lump Sums:	(5)			(3)		(8)
Data Adjustments:	<u>5</u>	<u>507</u>	<u>27</u>	<u>(11)</u>		<u>528</u>
June 30, 2014	5,756	646	653	3,943	296	11,294

<sup>1</sup> Last year, this included 903 beneficiaries and 7 participants who were retirement eligible but had not commenced benefit payments. This year, this includes 927 beneficiaries and 12 participants who are retirement eligible but have not commenced benefit payments.

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SECTION VI - ACTUARIAL ASSUMPTIONS AND METHODS

**ACTUARIAL ASSUMPTIONS AND METHODS**

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B. Actuarial Methods for Funding Purposes	36
C. Actuarial Methods for GASB 67 and GASB 68 Purposes	37

SECTION VI - ACTUARIAL ASSUMPTIONS AND METHODS

**A. Actuarial Assumptions**

The assumptions used in the valuation were selected and approved by the City of Memphis. The actuary and other economic and investment professionals provide advice for selecting the economic and demographic assumptions. In our opinion, the assumptions are reasonable for purposes of this valuation.

Interest Rate / Investment Return	7.5% per year for funding purposes 7.5% per year for GASB 27 and GASB 67 purposes
Future Salary Increases	Scale that varies by age and service with a weighted average of 4.25% per year
Cost of Living Increases	N/A
Mortality	<p>General: Fully Generational RP-2014 Mortality Table for males and females with 1 year set forward</p> <p>Police and Fire: Fully Generational RP-2014 Mortality Table with Blue Collar adjustment for males and females with a 1 year set forward</p> <p>Disabled: Fully Generational RP-2014 Disabled Mortality Table with 3 year set back</p>
Disability	1968 Social Security Experience Table. Sample rates are shown below:

Age	Combined Male / Female
20	0.10%
25	0.10%
30	0.10%
35	0.10%
40	0.17%
45	0.28%
50	0.63%
55+	1.33%



SECTION VI - ACTUARIAL ASSUMPTIONS AND METHODS

**A. Actuarial Assumptions (continued)**

Termination

Select and Ultimate rates. Sample rates are shown below:

Police & Fire: Males

Age	Years of Service					
	0	1	2	3	4	5+
20	13.0%	5.0%	5.0%	5.0%	5.0%	5.0%
25	15.0%	5.0%	5.0%	5.0%	5.0%	4.0%
30	17.0%	5.0%	4.0%	4.0%	3.0%	3.0%
35	15.0%	5.0%	5.0%	5.0%	4.0%	3.0%
40	18.0%	4.0%	4.0%	4.0%	2.0%	2.0%
45	17.0%	20.0%	5.0%	5.0%	2.0%	2.0%
50	15.0%	20.0%	5.0%	5.0%	2.0%	2.0%
55	15.0%	20.0%	5.0%	5.0%	2.0%	2.0%

General: Males

Age	Years of Service					
	0	1	2	3	4	5+
20	55.0%	52.0%	47.0%	45.0%	40.0%	40.0%
25	63.0%	57.0%	31.0%	17.0%	7.0%	9.5%
30	46.0%	46.0%	18.0%	14.0%	14.0%	8.0%
35	22.0%	22.0%	17.0%	7.0%	7.0%	6.0%
40	26.0%	4.0%	11.0%	11.0%	10.0%	5.0%
45	5.0%	5.0%	5.0%	5.0%	5.0%	4.0%
50	5.0%	5.0%	5.0%	5.0%	3.0%	4.0%
55	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%

SECTION VI - ACTUARIAL ASSUMPTIONS AND METHODS

**A. Actuarial Assumptions (continued)**

Termination (cont.)	General, Police & Fire: Females						
	Age	Years of Service					
	0	1	2	3	4	5+	
20	25.0%	22.0%	20.0%	20.0%	20.0%	5.0%	
25	24.0%	16.0%	14.0%	10.0%	12.0%	6.0%	
30	26.0%	17.0%	12.0%	13.0%	13.0%	6.0%	
35	14.0%	11.0%	15.0%	11.0%	11.0%	4.0%	
40	18.0%	14.0%	8.0%	8.0%	7.0%	4.0%	
45	18.0%	14.0%	8.0%	8.0%	5.0%	4.0%	
50	6.0%	6.0%	7.0%	7.0%	5.0%	4.0%	
55	6.0%	6.0%	7.0%	7.0%	5.0%	4.0%	

Retirement Age

1948 Plan: General - Earlier of age 60 and 10 years of service or 25 years of service  
 Police and Fire - Earlier of Age 60 and 10 years of service or 30 years of service

1978 and 2012 Plans: General - Earliest of 25 years of service, age 60 and 10 years of service,  
 or age 65 and 5 years of service  
 Police and Fire - Earlier of 25 years of service or age 65 and 5 years of service

Retirement Rates For both General employees and Police and Fire employees, the rates vary by age

Age	Police and Fire	General
	Males & Females	Males
45 - 49	25%	20%
50 - 54	25%	25%
55 - 59	25%	25%
60 - 64	40%	25%
65 - 69	100%	100%
70	100%	100%

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SECTION VI - ACTUARIAL ASSUMPTIONS AND METHODS

**A. Actuarial Assumptions (continued)**

Marriage	80% of male General Employees, 50% of female General Employees, and 80% of Police and Fire Employees are assumed to be married. Wives are assumed to be three years younger than their husbands.
Death/Disability	Deaths and disabilities for active General Employees are assumed to be other than line-of-duty. Deaths and disabilities for active Police and Fire Employees are assumed to be line-of-duty.
Form of Payment	It has been assumed that benefits will be paid in the normal annuity form applicable to the particular benefit. It has also been assumed that the General Employees who withdraw prior to retirement age will elect to receive their employee contributions time the applicable return multiple. Police and Fire Employees who withdraw prior to ten years of service will receive their employee contributions, and those who withdraw after ten years of service will receive their accrued benefit.
Expense Load	None.
Changes in Assumptions	<p>The retirement assumption for General Employees changed from 100% at earliest eligibility to a graded table that varies by age and gender. The retirement rates for Police and Fire Employees were changed from 100% at earliest eligibility to a graded table that varies by age only.</p> <p>The termination rate assumption changed from a sex-distinct age-based table for male General Employees and male Police and Fire Employees to a select and ultimate table that varies by age and gender.</p> <p>The marital assumptions for General Employees were changed from husbands assumed to be 5 years older than their wives to husbands assumed to be 3 years older than their wives. The marital assumption for Police and Fire was changed from 90% assumed to be married to 80% assumed to be married and from husbands assumed to be 5 years older than their wives to husbands assumed to be 3 years older than their wives.</p>

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SECTION VI - ACTUARIAL ASSUMPTIONS AND METHODS

**A. Actuarial Assumptions (continued)**

Changes in Assumptions  
(continued)

The mortality table for General Employees was changed from the Fully Generational RP-2000 Combined Mortality Table for males and females to the Fully Generational RP-2014 Mortality Table for males and females with 1 year set forward. The mortality table for Police and Fire was changed from the Fully Generational RP-2000 Combined Mortality Table with Blue Collar adjustment for males and females to the Fully Generational RP-2014 Mortality Table with Blue Collar adjustment for males and females with 1 year set forward. In addition, the mortality table for disabled participants was changed to the Fully Generational RP-2014 Disabled Table with 3 year set back.

The salary increase assumption changed from flat 5.0% for all employees to a scale that varies by age and service. The weighted average salary increase under the new salary scale is 4.25%.

The asset method for funding purposes changed from a rolling actuarial value with a 10% corridor to an actuarial value that smoothes asset gains and losses over a 5 year period with a 10% corridor. The impact of this change is an increase of \$24,263,000 to the actuarial value of assets, or approximately a 3.74% decrease in the unfunded actuarial accrued liability. See Appendix 1 for a development of what the 2014 actuarial value of assets would have been using last year's method.

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## SECTION VI - ACTUARIAL ASSUMPTIONS AND METHODS

### **B. Actuarial Methods for Funding Purposes**

1. Actuarial Cost Method

The actuarial cost method is the Entry Age Normal Actuarial Cost Method. This method determines a normal cost rate as a fixed percentage of compensation for each active participant. The current year's normal cost is the participant's compensation multiplied by the normal cost rate. Annual contributions in this amount, from the date the participant entered the plan (or would have entered, if the plan had always been in effect and the participant had entered at the earliest possible date) until retirement, would be sufficient to provide for the actuarial present value of the participant's plan benefits. The total normal cost is the sum of the normal costs for all active participants.

The actuarial accrued liability is the present value of future benefits, for both active and inactive participants, less the present value of future normal costs.

2. Asset Valuation Method

The actuarial value of assets is equal to the fair value of assets adjusted for gains and losses on investments recognized over a five-year period. The annual investment gain/loss amount is equal to the difference between the expected return on the fair value of assets and the actual return on assets. If the resulting value is outside the 90% to 110% range, the amount is further adjusted to be a maximum of 110% of market value or a minimum of 90% of market value. Last year, the actuarial value of assets were developed using a rolling actuarial value with 10% a corridor.

3. Anticipated Payroll

The Anticipated Payroll is equal to actual payroll during the prior year for members who are still active on the valuation date, adjusted for one year of assumed salary increases. The Anticipated Payroll does not include amounts for members who have reached the age at which retirement is assumed to occur immediately. This does not include payroll pertaining to members of the DROP as employee and City contributions cease upon entering the DROP Program.

4. Changes in Actuarial Methods

The prior year actuarial value of assets was developed by increasing the prior year's actuarial value, plus any net cash flow, by the assumed interest rate of 7.5%. If the resulting value is between 90% and 110% of actual market value, no further adjustment is made. If the resulting value is outside the 90% to 110% range, the amount is further adjusted to be a maximum of 110% of market value or a minimum of 90% of market value. The City changed the method to comply with The Public Employee Defined Benefit Financial Security Act of 2014.

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## SECTION VI - ACTUARIAL ASSUMPTIONS AND METHODS

### **C. Actuarial Methods for GASB 67 and GASB 68 Purposes**

1. Actuarial Cost Method

The actuarial cost method is the Entry Age Normal Actuarial Cost Method. This method determines a normal cost rate as a fixed percentage of compensation for each active participant. The current year's normal cost is the participant's compensation multiplied by the normal cost rate. Annual contributions in this amount, from the date the participant entered the plan (or would have entered, if the plan had always been in effect and the participant had entered at the earliest possible date) until retirement, would be sufficient to provide for the actuarial present value of the participant's plan benefits. The total normal cost is the sum of the normal costs for all active participants.

The actuarial accrued liability is the present value of future benefits, for both active and inactive participants, less the present value of future normal costs.

2. Asset Valuation Method

Fair value of assets.

3. Changes in Actuarial Methods

No changes from the prior year.

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SECTION VII - SUMMARY OF PLAN PROVISIONS

**SUMMARY OF PLAN PROVISIONS**

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B. Summary of Plan Provisions: Police and Fire Employees	44

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SECTION VII - SUMMARY OF PLAN PROVISIONS

**A. Summary of Plan Provisions: General Employees**

<b>Effective Date</b>	Originally effective October 1, 1948. Revised July 1, 1978, January 1, 1990, December 1, 2000, and July 1, 2012.
<b>Participation</b>	All regular salaried employees become plan participants on their date of hire. To participate in the 1948 Plan an employee must have been hired before July 1, 1978. To participate in the 1978 Plan an employee must be hired after June 30, 1978. To participate in the 2012 Plan an employee must be hired after June 30, 2012.
<b>Compensation</b>	Basic salary, excluding overtime, but including shift premium, hazardous pay, longevity pay and incentive pay.
<b>Average Monthly Compensation</b>	<p>The highest average monthly Compensation received for any five consecutive years of service, or the most recent year's earnings, if greater.</p> <p>For participants hired after June 30, 2012, highest average monthly Compensation received for any three consecutive years of service.</p>
<b>Year of Service</b>	One year of service is earned for each 12-month period beginning at date of employment. Fractional periods (months and days) are also credited.



SECTION VII - SUMMARY OF PLAN PROVISIONS

**A. Summary of Plan Provisions: General Employees (continued)**

**Accrued Benefit**

An employee may choose between (1) and (2):

(1) The sum of (a) and (b):

(a) For the 1948 Plan and 1978 Plan:  $2\frac{1}{4}\%$  of Average Monthly Compensation times Years of Service before 1/1/90 plus  $2\frac{1}{2}\%$  of Average Monthly Compensation times Years of Service after 1/1/90.

For the 2012 Plan:  $2\frac{1}{4}\%$  of Average Monthly Compensation times Years of Service

Total Years of Service in part (a) must not exceed 25 years.

(b) 1% of Average Monthly Compensation times Years of Service in excess of 25, up to a maximum. maximum total retirement benefit of  $72\frac{1}{2}\%$ .

(2) Return of Employee Contributions in accordance with the following schedule:

<u>Years of Service</u>	<u>Return Multiple</u>
less than 5	1.0
5 to 14	1.5 - 2.9
15 or more	3.0

**Minimum Accrued Benefit**

<u>Years of Service</u>	<u>At Age</u>	<u>Minimum</u>
25 or more	No Restriction	\$525 plus \$21 times the lesser of 10 or Years of Service in excess of 25
15 or more	65 or after	\$500 plus \$1 times the lesser of 25 or Years of Service
less than 25	Before 65	The greater of \$262.50 or \$21 times Years of Service

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SECTION VII - SUMMARY OF PLAN PROVISIONS

**A. Summary of Plan Provisions: General Employees (continued)**

**Normal Form of Annuity**      If single, an annuity for the life of the participant. A married participant will receive this annuity during his lifetime with a 75% continuation to his spouse upon his death. For 1948 Plan participants, 100% of the annuity is payable to the spouse upon the death of the participant.

**Normal Retirement**      For 1948 Plan participants, first day of the month coincident with or next following the earlier of the following dates:

- (a) Age 60 and completion of 10 Years of Service; or
- (b) Completion of 25 Years of Service.

For 1978 Plan participants, first day of the month coincident with or next following the earliest of the following dates:

- (a) Age 60 and completion of 10 Years of Service;
- (b) Age 65 and completion of 5 Years of Service; or
- (c) Completion of 25 Years of Service.

For elected and appointed participants hired before November 1, 2004, first day of month coincident with or next following completion of 12 Years of Service.

For 2012 Plan participants, first day of the month coincident with or next following the earliest of the following dates:

- (a) Age 65 and the completion of 5 Years of Service; or
- (b) Completion of 25 Years of Service

Benefit Amount: Accrued Benefit determined as of Normal Retirement Date.

A reduction of 5% per year for each year that the commencement date precedes the date the participant will attain age 62.

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SECTION VII - SUMMARY OF PLAN PROVISIONS

**A. Summary of Plan Provisions: General Employees (continued)**

**Disability**

Eligibility: No service requirement for line-of-duty; five years of service for non line-of-duty.

Line-of-Duty: A participant who becomes disabled while performing City duties is entitled to receive the greater of:

- (1) 60% of Average Monthly Compensation as of date of disability; or
- (2) Accrued Benefit as of date of disability.

Other: For 1948 Plan participants, disabled employees while actively employed for reasons other than line-of-duty is entitled to receive the greater of:

- (1) 25% of Average Monthly Compensation as of date of disability; or
- (2) Accrued Benefit as of date of disability, but not greater than 56¼% of Average Monthly Compensation

For 1978 Plan participants, disabled employees while actively employed for reasons other than line-of-duty is entitled to receive the Accrued Benefit as of date of disability.

For 2012 Plan participants, disabled employees while actively employed for reasons other than line-of-duty is entitled to receive the Accrued Benefit as of date of disability.

**Termination**

Eligibility: Termination of employment after completion of 10 Years of Service.

Benefit Amount: Accrued Benefit determined as of termination date becomes payable at age 65 for 1948 and 1978 Plan participants and at age 62 for 2012 Plan participants. At the option of the participant, the benefit may become payable earlier, but is reduced to reflect early commencement. An employee terminating before completing 10 Years of Service is only eligible to receive the return of Employee Contributions times the appropriate multiple.

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SECTION VII - SUMMARY OF PLAN PROVISIONS

**A. Summary of Plan Provisions: General Employees (continued)**

**Involuntary Retirement**

Eligibility:	Completion of 15 years of service
Benefit Amount:	For 1948 Plan participants, Accrued Benefit determined as of involuntary retirement date becomes payable on date of retirement.  For 1978 Plan participants, Accrued Benefit determined as of date of involuntary retirement becomes payable when age plus service equals 75.  For 2012 Plan participants, Accrued Benefit determined as of date of involuntary retirement becomes payable when age plus service equals 75.

**Pre-Retirement Death Benefit**

Eligibility:	No service requirement for Line-of-Duty; 5 years of service for non line-of-duty.
Line-of-Duty	The surviving spouse (or children) of a participant who dies while performing City duties is entitled to receive the greater of:  (1) 60% of Average Monthly Compensation as of date of death; or (2) Accrued Benefit as of date of death.
Other:	The surviving spouse (or children) of a participant who dies while actively employed will receive 75% (100% for 1948 Plan) of the participant's Accrued Benefit as of date of the participant's death.

**Employee Contributions**

Employees in the 1948 Plan must contribute five percent (5%) of Compensation. Employees in the 1978 Plan and 2012 Plan must contribute eight percent (8%) of Compensation (changed effective July 1, 2001).

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SECTION VII - SUMMARY OF PLAN PROVISIONS

**A. Summary of Plan Provisions: General Employees (continued)**

**Changes From Prior  
Valuation**

There have been no changes in Plan Provisions since the last Valuation.

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SECTION VII - SUMMARY OF PLAN PROVISIONS

**B. Summary of Plan Provisions: Police and Fire Employees**

<b>Effective Date</b>	Originally effective October 1, 1948. Revised July 1, 1978, January 1, 1990, December 1, 2000, and July 1, 2012.
<b>Participation</b>	All regular salaried employees become plan participants on their date of hire. To participate in the 1948 Plan an employee must have been hired before July 1, 1978. To participate in the 1978 Plan an employee must be hired after June 30, 1978. To participate in the 2012 Plan an employee must be hired after June 30, 2012.
<b>Compensation</b>	Basic salary, excluding overtime, but including shift premium, hazardous pay, longevity pay and incentive pay.
<b>Average Monthly Compensation</b>	For 1948 Plan participants, the highest average monthly Compensation received for any five consecutive years of service, or the most recent year's earnings, if greater. For 1978 and 2012 Plan participants, the highest average monthly Compensation received for any three consecutive years of service preceding the participant's date of termination. Police officers hired prior to January 31, 1979 who retire with thirty years of service have their accrued benefit determined based on Captain's compensation if greater than their actual compensation, regardless of their rank.
<b>Year of Service</b>	One year of service is earned for each 12-month period beginning at date of employment. Fractional periods (months and days) are also credited.

SECTION VII - SUMMARY OF PLAN PROVISIONS

**B. Summary of Plan Provisions: Police and Fire Employees (continued)**

**Accrued Benefit**

(1) The sum of (a) and (b):

(a) For the 1948 Plan and 1978 Plan:  $2\frac{1}{4}\%$  of Average Monthly Compensation times Years of Service before 1/1/90 plus  $2\frac{1}{2}\%$  of Average Monthly Compensation times Years of Service after 1/1/90.

For the 2012 Plan:  $2\frac{1}{4}\%$  of Average Monthly Compensation times Years of Service

Total Years of Service in part (a) must not exceed 25 years.

(b) 1% of Average Monthly Compensation times Years of Service in excess of 25, up to a maximum. maximum total retirement benefit of  $72\frac{1}{2}\%$ .

**Minimum Accrued Benefit**

<u>Years of Service</u>	<u>At Age</u>	<u>Minimum</u>
25 or more	No Restriction	\$525 plus \$21 times the lesser of 10 or Years of Service in excess of 25
15 or more	65 or after	\$500 plus \$1 times the lesser of 25 or Years of Service
less than 25	Before 65	The greater of \$262.50 or \$21 times Years of Service

**Normal Form of Annuity**

If single, an annuity for the life of the participant. A married participant will receive this annuity during his lifetime with a 75% continuation to his spouse upon his death. For 1948 plan participants, 100% of the annuity is payable to the spouse upon the death of the participant.

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SECTION VII - SUMMARY OF PLAN PROVISIONS

**B. Summary of Plan Provisions: Police and Fire Employees (continued)**

**Normal Retirement**

For 1948 Plan participants, first day of the month coincident with or next following the earlier of the following dates:

- (a) Age 55 and completion of 10 Years of Service; or
- (b) Completion of 25 Years of Service.

For 1978 Plan participants, first day of the month coincident with or next following the earliest of the following dates:

- (a) Age 55 and completion of 10 Years of Service;
- (b) Completion of 25 Years of Service.

For 2012 Plan participants, first day of the month coincident with or next following the earliest of the following dates:

- (a) Age 55 and completion of 10 Years of Service
- (b) Completion of 25 Years of Service

**Benefit Amount:** Accrued Benefit determined as of Normal Retirement Date.

A reduction of 5% per year for each year that the commencement date precedes the date the participant will attain age 52.



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SECTION VII - SUMMARY OF PLAN PROVISIONS

**B. Summary of Plan Provisions: Police and Fire Employees (continued)**

**Disability**

Eligibility: No service requirement for line-of-duty; five years of service for non line-of-duty.

Line-of-Duty: A participant who becomes disabled while performing City duties is entitled to receive the greater of:

- (1) 60% of Average Monthly Compensation as of date of disability; or
- (2) Accrued Benefit as of date of disability.

Other: For 1948 Plan participants, an employee who becomes disabled while actively employed for reasons other than line-of-duty is entitled to receive the greater of:

- (1) 25% of Average Monthly Compensation as of date of disability; or
- (2) Accrued Benefit as of date of disability, but not greater than 56¼% of Average Monthly Compensation

For 1978 Plan participants, an employee who becomes disabled while actively employed for reasons other than line-of-duty is entitled to receive the Accrued Benefit as of date of disability.

For 2012 Plan participants, an employee who becomes disabled while actively employed for reasons other than line-of-duty is entitled to receive the Accrued Benefit as of date of disability.

**Termination**

Eligibility: Termination of employment after completion of 10 Years of Service.

Benefit Amount: Accrued Benefit determined as of termination date becomes payable at age 60. At the option of the participant, the benefit may become payable earlier, but is reduced to reflect early commencement. An employee terminating before completing 10 Years of Service is only eligible to receive the return of Employee Contributions times the appropriate multiple.

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SECTION VII - SUMMARY OF PLAN PROVISIONS

**B. Summary of Plan Provisions: Police and Fire Employees (continued)**

**Pre-Retirement Death Benefit**

Eligibility:	No service requirement for line-of-duty; 5 years of service for non line-of-duty.
Line-of-Duty	The surviving spouse (or children) of a participant who dies while performing City duties is entitled to receive the greater of:  (1) 60% of Average Monthly Compensation as of date of death; or (2) Accrued Benefit as of date of death.
Other:	The surviving spouse (or children) of a participant who dies while actively employed will receive 75% (100% for 1948 Plan) of the participant's Accrued Benefit as of the date of the participant's death.

SECTION VII - SUMMARY OF PLAN PROVISIONS

**B. Summary of Plan Provisions: Police and Fire Employees (continued)**

**Employee Contributions**

Employees are required to contribute a percentage of Compensation in accordance with the following schedule:

1948 Plan:	<u>Years of Service</u> at 1/1/90	Percentage
	up to 15 years	5.50%
	15-19 years	5.25%
	20 years or more	5.00%
1978 Plan:	<u>Date of Hire</u>	Percentage
	After 6/30/83	6.50%
	Before 7/1/83	6.25%

The contribution rate for current non-vested employees will increase annually in 0.5% increments beginning July 1, 2012 until the contribution rate reaches 8.0%.

2012 Plan:	<u>Date of Hire</u>	Percentage
	After 6/30/2012	8.00%

**Changes From Prior Valuation**

There have been no changes in Plan Provisions since the last Valuation.

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APPENDICES

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APPENDIX I

**A. Development of Actuarial Value of Assets under the Rolling Actuarial Value with a 10% Corridor (prior year's method)**

1. Actuarial Value of Assets at 7/1/2013:	\$ 1,883,786,000
2. Contributions:	\$ 43,613,000
3. Benefit Payments:	\$ (170,833,000)
4. Interest Calculation	
a. Interest on Actuarial Value of Assets: (1) x 7.50%	\$ 141,284,000
b. Interest on Contributions and Benefit Payments: ((2) + (3)) x 7.50% / 2	\$ (4,771,000)
5. Preliminary AVA at 7/1/2014: (1) + (2) + (3) + (4)(a) + (4)(b)	\$ 1,893,079,000
6. Market Value of Assets at 7/1/2014:	\$ 2,245,158,000
7. Corridor Calculation	
a. 90% of the Actuarial Value of Assets: (6) x .90	\$ 2,020,642,000
b. 110% of the Actuarial Value of Assets: (6) x 1.1	\$ 2,469,674,000
8. Actuarial Value of Assets at 7/1/2014 under old method: Greater of (7)(a) and (6), and lesser of (7)(b) and (6)	\$ 2,020,642,000

APPENDIX II

**Table 1: Projection of Contributions**

Year	Projected Covered-Employee Payroll <sup>1</sup>			Projected Employer and Employee Contributions				
	Payroll for Current Employees	Payroll for Future Employees	Total Employee Payroll	Contributions for Current Employees	UAAL Amortization	Total Contribution	Phase In - Funding Policy	Total Contributions <sup>2</sup>
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
		(c) - (a)		(a) × 16.00%		(d) + (e)		(f) × (g)
0	\$ 340,532,000	\$ -	\$ 340,532,000	\$ 54,491,584	\$ 43,648,000	\$ 98,139,584	59%	\$ 70,960,475
1	330,752,675	24,251,935	355,004,610	52,926,706	43,648,000	96,574,706	67%	72,496,420
2	319,531,499	50,560,807	370,092,306	51,131,105	43,648,000	94,779,105	75%	76,968,242
3	310,303,245	75,517,984	385,821,229	49,654,410	43,648,000	93,302,410	84%	81,564,389
4	300,616,961	101,601,670	402,218,631	48,104,420	43,648,000	91,752,420	92%	85,954,726
5	290,310,898	129,002,025	419,312,923	46,455,254	43,648,000	90,103,254	100%	90,103,254
6	279,559,439	157,574,284	437,133,722	44,734,817	43,648,000	88,382,817	100%	88,382,817
7	266,666,089	189,045,816	455,711,905	42,671,636	43,648,000	86,319,636	100%	86,319,636
8	253,083,334	221,996,327	475,079,661	40,498,138	43,648,000	84,146,138	100%	84,146,138
9	239,551,292	255,719,255	495,270,547	38,332,754	43,648,000	81,980,754	100%	81,980,754
10	223,579,543	292,740,002	516,319,545	35,776,971	43,648,000	79,424,971	100%	79,424,971
11	208,355,825	329,907,301	538,263,126	33,340,887	43,648,000	76,988,887	100%	76,988,887
12	194,647,524	366,491,784	561,139,309	31,147,299	43,648,000	74,795,299	100%	74,795,299
13	180,534,027	404,453,702	584,987,729	28,888,871	43,648,000	72,536,871	100%	72,536,871
14	167,080,112	442,769,596	609,849,708	26,735,989	43,648,000	70,383,989	100%	70,383,989
15	153,051,555	482,716,766	635,768,320	24,491,154	43,648,000	68,139,154	100%	68,139,154
16	139,714,094	523,074,380	662,788,474	22,356,907	43,648,000	66,004,907	100%	66,004,907
17	128,276,587	562,680,397	690,956,984	20,526,689	43,648,000	64,174,689	100%	64,174,689
18	117,331,344	602,991,312	720,322,656	18,775,242	43,648,000	62,423,242	100%	62,423,242
19	105,809,185	645,127,184	750,936,369	16,931,478	43,648,000	60,579,478	100%	60,579,478
20	92,158,553	690,692,611	782,851,165	14,747,118	43,648,000	58,395,118	100%	58,395,118
21	77,752,326	738,370,013	816,122,339	12,441,848	43,648,000	56,089,848	100%	56,089,848
22	63,986,734	786,820,804	850,807,539	10,239,092	43,648,000	53,887,092	100%	53,887,092
23	51,649,572	835,317,287	886,966,859	8,264,912	43,648,000	51,912,912	100%	51,912,912
24	40,599,070	884,063,880	924,662,950	6,496,622	43,648,000	50,144,622	100%	50,144,622
25	30,595,971	933,365,155	963,961,126	4,895,936	43,648,000	48,543,936	100%	48,543,936
26	22,775,183	982,154,291	1,004,929,474	3,644,462	43,648,000	47,292,462	100%	47,292,462
27	16,896,283	1,030,742,693	1,047,638,976	2,703,726	43,648,000	46,351,726	100%	46,351,726
28	12,339,666	1,079,823,967	1,092,163,633	1,974,581	43,648,000	45,622,581	100%	45,622,581
29	8,844,265	1,129,736,323	1,138,580,587	1,415,250	43,648,000	45,063,250	100%	45,063,250
30	6,190,455	1,180,779,807	1,186,970,262	990,590	-	990,590	100%	990,590
31	4,239,167	1,233,177,331	1,237,416,498	678,347	-	678,347	100%	678,347
32	2,851,694	1,287,155,006	1,290,006,699	456,325	-	456,325	100%	456,325
33	1,880,325	1,342,951,659	1,344,831,984	300,888	-	300,888	100%	300,888

<sup>1</sup> For the current active population and pursuant to the assumptions set forth in Section VI. Payroll for future employees is expected to increase by 4.25% annually.

<sup>2</sup> For the current plan year, the expected contribution is set equal to \$47,000,000 which is budgeted by the City of Memphis.

APPENDIX II

**Table 1: Projection of Contributions**

Year	Projected Covered-Employee Payroll <sup>1</sup>			Projected Contributions				
	Payroll for Current Employees	Payroll for Future Employees	Total Employee Payroll	Contributions for Current Employees	UAAL Amortization	Total Contribution	Phase In - Funding Policy	Total Contributions <sup>2</sup>
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
	(a)	(c) - (a)	(c)	(a) × 16.00%	(e)	(d) + (e)	(g)	(f) × (g)
34	1,189,854	1,400,797,490	1,401,987,344	190,399	-	\$ 190,399	100%	190,399
35	728,049	1,460,843,757	1,461,571,806	116,502	-	\$ 116,502	100%	116,502
36	424,468	1,523,264,139	1,523,688,607	67,923	-	\$ 67,923	100%	67,923
37	238,605	1,588,206,769	1,588,445,373	38,181	-	\$ 38,181	100%	38,181
38	130,685	1,655,823,617	1,655,954,302	20,912	-	\$ 20,912	100%	20,912
39	62,715	1,726,269,644	1,726,332,359	10,036	-	\$ 10,036	100%	10,036
40	27,748	1,799,673,736	1,799,701,485	4,440	-	\$ 4,440	100%	4,440
41	10,196	1,876,178,602	1,876,188,798	1,632	-	\$ 1,632	100%	1,632
42	3,507	1,955,923,315	1,955,926,822	561	-	\$ 561	100%	561
43	1,650	2,039,052,061	2,039,053,712	264	-	\$ 264	100%	264
44	58	2,125,713,437	2,125,713,494	9	-	\$ 9	100%	9
45	-	2,216,056,318	2,216,056,318	-	-	\$ -	100%	-
46	-	2,310,238,711	2,310,238,711	-	-	\$ -	100%	-
47	-	2,408,423,857	2,408,423,857	-	-	\$ -	100%	-
48	-	2,510,781,870	2,510,781,870	-	-	\$ -	100%	-
49	-	2,617,490,100	2,617,490,100	-	-	\$ -	100%	-
50	-	2,728,733,429	2,728,733,429	-	-	\$ -	100%	-
51	-	2,844,704,600	2,844,704,600	-	-	\$ -	100%	-
52	-	2,965,604,545	2,965,604,545	-	-	\$ -	100%	-
53	-	3,091,642,739	3,091,642,739	-	-	\$ -	100%	-
54	-	3,223,037,555	3,223,037,555	-	-	\$ -	100%	-
55	-	3,360,016,651	3,360,016,651	-	-	\$ -	100%	-
56	-	3,502,817,359	3,502,817,359	-	-	\$ -	100%	-
57	-	3,651,687,096	3,651,687,096	-	-	\$ -	100%	-
58	-	3,806,883,798	3,806,883,798	-	-	\$ -	100%	-
59	-	3,968,676,359	3,968,676,359	-	-	\$ -	100%	-
60	-	4,137,345,105	4,137,345,105	-	-	\$ -	100%	-
61	-	4,313,182,272	4,313,182,272	-	-	\$ -	100%	-
62	-	4,496,492,518	4,496,492,518	-	-	\$ -	100%	-
63	-	4,687,593,450	4,687,593,450	-	-	\$ -	100%	-
64	-	4,886,816,172	4,886,816,172	-	-	\$ -	100%	-
65	-	5,094,505,859	5,094,505,859	-	-	\$ -	100%	-
66	-	5,311,022,358	5,311,022,358	-	-	\$ -	100%	-
67	-	5,536,740,808	5,536,740,808	-	-	\$ -	100%	-

<sup>1</sup> For the current active population and pursuant to the assumptions set forth in Section VI.

<sup>2</sup> For the current plan year, the expected contribution is set equal to \$47,000,000 which is budgeted by the City of Memphis.

APPENDIX II

**Table 1: Projection of Contributions**

Year	Projected Covered-Employee Payroll <sup>1</sup>			Projected Contributions				
	Payroll for Current Employees	Payroll for Future Employees	Total Employee Payroll	Contributions for Current Employees	UAAL Amortization	Total Contribution	Phase In - Funding Policy	Total Contributions <sup>2</sup>
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
		(c) - (a)		(a) × 8.50%		(d) + (e)		(f) × (g)
68	-	5,772,052,293	5,772,052,293	-	-	\$ -	100%	-
69	-	6,017,364,515	6,017,364,515	-	-	\$ -	100%	-
70	-	6,273,102,507	6,273,102,507	-	-	\$ -	100%	-
71	-	6,539,709,364	6,539,709,364	-	-	\$ -	100%	-
72	-	6,817,647,012	6,817,647,012	-	-	\$ -	100%	-
73	-	7,107,397,010	7,107,397,010	-	-	\$ -	100%	-
74	-	7,409,461,383	7,409,461,383	-	-	\$ -	100%	-
75	-	7,724,363,491	7,724,363,491	-	-	\$ -	100%	-
76	-	8,052,648,940	8,052,648,940	-	-	\$ -	100%	-
77	-	8,394,886,520	8,394,886,520	-	-	\$ -	100%	-
78	-	8,751,669,197	8,751,669,197	-	-	\$ -	100%	-
79	-	9,123,615,138	9,123,615,138	-	-	\$ -	100%	-
80	-	9,511,368,781	9,511,368,781	-	-	\$ -	100%	-
81	-	9,915,601,954	9,915,601,954	-	-	\$ -	100%	-
82	-	10,337,015,037	10,337,015,037	-	-	\$ -	100%	-
83	-	10,776,338,176	10,776,338,176	-	-	\$ -	100%	-
84	-	11,234,332,549	11,234,332,549	-	-	\$ -	100%	-
85	-	11,711,791,682	11,711,791,682	-	-	\$ -	100%	-
86	-	12,209,542,829	12,209,542,829	-	-	\$ -	100%	-
87	-	12,728,448,399	12,728,448,399	-	-	\$ -	100%	-
88	-	13,269,407,456	13,269,407,456	-	-	\$ -	100%	-
89	-	13,833,357,273	13,833,357,273	-	-	\$ -	100%	-
90	-	14,421,274,957	14,421,274,957	-	-	\$ -	100%	-
91	-	15,034,179,142	15,034,179,142	-	-	\$ -	100%	-
92	-	15,673,131,756	15,673,131,756	-	-	\$ -	100%	-
93	-	16,339,239,856	16,339,239,856	-	-	\$ -	100%	-
94	-	17,033,657,549	17,033,657,549	-	-	\$ -	100%	-
95	-	17,757,587,995	17,757,587,995	-	-	\$ -	100%	-
96	-	18,512,285,485	18,512,285,485	-	-	\$ -	100%	-
97	-	19,299,057,618	19,299,057,618	-	-	\$ -	100%	-
98	-	20,119,267,567	20,119,267,567	-	-	\$ -	100%	-
99	-	20,974,336,439	20,974,336,439	-	-	\$ -	100%	-
100	-	21,865,745,737	21,865,745,737	-	-	\$ -	100%	-

<sup>1</sup> For the current active population and pursuant to the assumptions set forth in Section VI.

<sup>2</sup> For the current plan year, the expected contribution is set equal to \$47,000,000 which is budgeted by the City of Memphis.



APPENDIX II

**Table 2: Projection of Pension Plan's Fiduciary Net Position**

Year	Projected Beginning Fiduciary Net Position (a)	Total Contributions (b)	Projected Benefit Payments (c)	Projected Administrative Expenses (d)	Projected Investment Earnings (e)	Projected Ending Fiduciary Net Position (f) (a) + (b) - (c) - (d) + (e)
0	\$ 2,245,158,033	\$ 70,960,475	\$ 171,443,910	\$ 1,541,126	\$ 163,662,414	\$ 2,306,795,886
1	2,282,835,411	72,496,420	176,653,281	1,496,868	167,250,641	2,344,432,323
2	2,344,432,323	76,968,242	181,667,339	1,446,085	171,807,453	2,410,094,593
3	2,408,907,203	81,564,389	186,587,945	1,404,321	176,588,960	2,479,068,285
4	2,476,720,681	85,954,726	191,328,824	1,360,485	181,621,056	2,551,607,154
5	2,548,128,538	90,103,254	196,205,980	1,313,843	186,909,865	2,627,621,834
6	2,623,044,383	88,382,817	202,004,691	1,265,186	192,420,064	2,700,577,386
7	2,700,577,386	86,319,636	208,282,635	1,206,835	197,924,435	2,775,331,987
8	2,775,331,987	84,146,138	214,502,698	1,145,365	203,218,577	2,847,048,640
9	2,847,048,640	81,980,754	221,479,302	1,084,123	208,256,798	2,914,722,766
10	2,914,722,766	79,424,971	229,098,441	1,011,841	212,953,508	2,976,990,962
11	2,976,990,962	76,988,887	235,794,947	942,944	217,283,735	3,034,525,694
12	3,034,525,694	74,795,299	242,289,351	880,905	221,275,366	3,087,426,102
13	3,087,426,102	72,536,871	248,696,032	817,032	224,920,350	3,135,370,259
14	3,135,370,259	70,383,989	255,027,277	756,145	228,200,291	3,178,171,117
15	3,178,171,117	68,139,154	261,052,724	692,657	231,102,600	3,215,667,491
16	3,215,667,491	66,004,907	266,437,087	632,296	233,635,144	3,248,238,159
17	3,248,238,159	64,174,689	270,543,867	580,534	235,857,248	3,277,145,695
18	3,277,145,695	62,423,242	274,459,568	531,000	237,814,652	3,302,393,022
19	3,302,393,022	60,579,478	279,076,849	478,854	239,467,868	3,322,884,665
20	3,322,884,665	58,395,118	284,010,732	417,077	240,740,124	3,337,592,098
21	3,337,592,098	56,089,848	288,813,595	351,879	241,579,071	3,346,095,542
22	3,346,095,542	53,887,092	292,761,663	289,581	241,988,510	3,348,919,900
23	3,348,919,900	51,912,912	295,624,563	233,747	242,021,040	3,346,995,542
24	3,346,995,542	50,144,622	297,310,944	183,737	241,749,038	3,341,394,521
25	3,341,394,521	48,543,936	297,764,220	138,466	241,253,636	3,333,289,407
26	3,333,289,407	47,292,462	296,697,477	103,072	240,640,152	3,324,421,471
27	3,324,421,471	46,351,726	294,496,331	76,467	240,023,320	3,316,223,720
28	3,316,223,720	45,622,581	291,359,414	55,845	239,499,554	3,309,930,596
29	3,309,930,596	45,063,250	287,626,338	40,026	239,147,178	3,306,474,660
30	3,306,474,660	990,590	283,119,756	28,016	237,404,705	3,261,722,184
31	3,261,722,184	678,347	278,035,071	19,185	234,227,567	3,218,573,842
32	3,218,573,842	456,325	272,345,096	12,906	231,196,725	3,177,868,890
33	3,177,868,890	300,888	266,196,733	8,510	228,368,753	3,140,333,289
34	3,140,333,289	-	259,525,003	5,385	225,799,747	3,106,602,648

APPENDIX II

**Table 2: Projection of Pension Plan's Fiduciary Net Position (cont.)**

Year	Projected Beginning Fiduciary Net Position (a)	Total Contributions (b)	Projected Benefit Payments (c)	Projected Administrative Expenses (d)	Projected Investment Earnings (e)	Projected Ending Fiduciary Net Position (f) (a) + (b) - (c) - (d) + (e)
35	3,106,793,047	190,399	252,548,384	3,295	223,543,159	3,077,974,926
36	3,077,901,029	116,502	245,249,869	1,921	221,648,182	3,054,413,923
37	3,054,365,344	67,923	237,742,754	1,080	220,163,439	3,036,852,872
38	3,036,823,131	38,181	230,133,866	591	219,132,477	3,025,859,332
39	3,025,842,063	20,912	222,393,150	284	218,598,777	3,022,068,317
40	3,022,057,441	10,036	214,575,023	126	218,607,907	3,026,100,235
41	3,026,094,639	4,440	206,659,694	46	219,207,419	3,038,646,759
42	3,038,643,950	1,632	198,685,987	16	220,447,592	3,060,407,171
43	3,060,406,100	561	190,661,350	7	222,380,666	3,092,125,970
44	3,092,125,673	264	182,590,763	0	225,062,272	3,134,597,445
45	3,134,597,191	9	174,483,843	-	228,551,645	3,188,665,002
46	3,188,664,993	-	166,352,033	-	232,911,673	3,255,224,633
47	3,255,224,633	-	158,210,136	-	238,208,967	3,335,223,463
48	3,335,223,463	-	150,075,855	-	244,513,915	3,429,661,524
49	3,429,661,524	-	141,969,752	-	251,900,749	3,539,592,520
50	3,539,592,520	-	133,914,517	-	260,447,645	3,666,125,648
51	3,666,125,648	-	125,934,112	-	270,236,894	3,810,428,431
52	3,810,428,431	-	118,053,021	-	281,355,144	3,973,730,553
53	3,973,730,553	-	110,295,935	-	293,893,694	4,157,328,312
54	4,157,328,312	-	102,688,332	-	307,948,811	4,362,588,791
55	4,362,588,791	-	95,254,836	-	323,622,103	4,590,956,058
56	4,590,956,058	-	88,019,385	-	341,020,977	4,843,957,651
57	4,843,957,651	-	81,005,067	-	360,259,134	5,123,211,718
58	5,123,211,718	-	74,233,221	-	381,457,133	5,430,435,630
59	5,430,435,630	-	67,723,365	-	404,743,046	5,767,455,311
60	5,767,455,311	-	61,492,789	-	430,253,169	6,136,215,691
61	6,136,215,691	-	55,555,984	-	458,132,827	6,538,792,535
62	6,538,792,535	-	49,924,936	-	488,537,255	6,977,404,853
63	6,977,404,853	-	44,609,745	-	521,632,499	7,454,427,607
64	7,454,427,607	-	39,617,988	-	557,596,396	7,972,406,015
65	7,972,406,015	-	34,954,961	-	596,619,640	8,534,070,694
66	8,534,070,694	-	30,624,063	-	638,906,900	9,142,353,531
67	9,142,353,531	-	26,626,359	-	684,678,026	9,800,405,198
68	9,800,405,198	-	22,960,596	-	734,169,368	10,511,613,971
69	10,511,613,971	-	19,623,267	-	787,635,175	11,279,625,879

APPENDIX II

**Table 2: Projection of Pension Plan's Fiduciary Net Position (cont.)**

Year	Projected Beginning Fiduciary Net Position (a)	Total Contributions (b)	Projected Benefit Payments (c)	Projected Administrative Expenses (d)	Projected Investment Earnings (e)	Projected Ending Fiduciary Net Position (f) (a) + (b) - (c) - (d) + (e)
70	11,279,625,879	-	16,608,723	-	845,349,114	12,108,366,270
71	12,108,366,270	-	13,909,345	-	907,605,870	13,002,062,795
72	13,002,062,795	-	11,515,593	-	974,722,875	13,965,270,077
73	13,965,270,077	-	9,415,937	-	1,047,042,158	15,002,896,298
74	15,002,896,298	-	7,596,427	-	1,124,932,356	16,120,232,226
75	16,120,232,226	-	6,040,724	-	1,208,790,890	17,322,982,392
76	17,322,982,392	-	4,730,208	-	1,299,046,297	18,617,298,482
77	18,617,298,482	-	3,643,917	-	1,396,160,739	20,009,815,304
78	20,009,815,304	-	2,758,986	-	1,500,632,686	21,507,689,004
79	21,507,689,004	-	2,051,313	-	1,612,999,751	23,118,637,442
80	23,118,637,442	-	1,496,403	-	1,733,841,693	24,850,982,732
81	24,850,982,732	-	1,070,208	-	1,863,783,572	26,713,696,096
82	26,713,696,096	-	749,952	-	2,003,499,084	28,716,445,229
83	28,716,445,229	-	514,735	-	2,153,714,090	30,869,644,583
84	30,869,644,583	-	346,025	-	2,315,210,368	33,184,508,926
85	33,184,508,926	-	227,958	-	2,488,829,621	35,673,110,589
86	35,673,110,589	-	147,413	-	2,675,477,766	38,348,440,942
87	38,348,440,942	-	93,835	-	2,876,129,552	41,224,476,659
88	41,224,476,659	-	59,064	-	3,091,833,534	44,316,251,128
89	44,316,251,128	-	37,031	-	3,323,717,446	47,639,931,544
90	47,639,931,544	-	23,339	-	3,572,993,991	51,212,902,195
91	51,212,902,195	-	14,937	-	3,840,967,105	55,053,854,363
92	55,053,854,363	-	9,792	-	4,129,038,710	59,182,883,282
93	59,182,883,282	-	6,606	-	4,438,715,998	63,621,592,673
94	63,621,592,673	-	4,589	-	4,771,619,278	68,393,207,362
95	68,393,207,362	-	3,265	-	5,129,490,430	73,522,694,527
96	73,522,694,527	-	2,360	-	5,514,202,001	79,036,894,168
97	79,036,894,168	-	1,718	-	5,927,766,998	84,964,659,448
98	84,964,659,448	-	1,247	-	6,372,349,412	91,337,007,613
99	91,337,007,613	-	899	-	6,850,275,537	98,187,282,251
100	98,187,282,251	-	636	-	7,364,046,145	105,551,327,760

APPENDIX II

**Table 3: Actuarial Present Values of Projected Benefit Payments**

Year	Projected Beginning Fiduciary Net Position	Projected Benefit Payments	Projected Benefit Payments		Actuarial Present Value of Projected Benefit Payments		
			Funded Portion of Benefit Payments	Unfunded Portion of Benefit Payments	Present Value of Funded Benefit Payments	Present Value of Unfunded Benefit Payments	Present Value of Benefit Payments Using the Single Discount Rate
(a)	(b)	(c)	(d)	(e)	(f) $(d) \div ((1 + 7.50\%)^{(a)+0.5})$	(g) $(e) \div ((1 + 4.31\%)^{(a)+0.5})$	(h) $(c) \div ((1 + 7.5\%)^{(a)+0.5})$
0	\$ 2,245,158,033	\$ 171,443,910	\$ 171,443,910	\$ -	\$ 165,355,190	\$ -	\$ 165,355,190
1	2,282,835,411	176,653,281	176,653,281	-	158,492,608	-	158,492,608
2	2,344,432,323	181,667,339	181,667,339	-	151,619,722	-	151,619,722
3	2,408,907,203	186,587,945	186,587,945	-	144,861,826	-	144,861,826
4	2,476,720,681	191,328,824	191,328,824	-	138,179,085	-	138,179,085
5	2,548,128,538	196,205,980	196,205,980	-	131,815,259	-	131,815,259
6	2,623,044,383	202,004,691	202,004,691	-	126,242,748	-	126,242,748
7	2,700,577,386	208,282,635	208,282,635	-	121,084,787	-	121,084,787
8	2,775,331,987	214,502,698	214,502,698	-	116,000,754	-	116,000,754
9	2,847,048,640	221,479,302	221,479,302	-	111,417,327	-	111,417,327
10	2,914,722,766	229,098,441	229,098,441	-	107,209,497	-	107,209,497
11	2,976,990,962	235,794,947	235,794,947	-	102,644,848	-	102,644,848
12	3,034,525,694	242,289,351	242,289,351	-	98,113,445	-	98,113,445
13	3,087,426,102	248,696,032	248,696,032	-	93,681,662	-	93,681,662
14	3,135,370,259	255,027,277	255,027,277	-	89,364,268	-	89,364,268
15	3,178,171,117	261,052,724	261,052,724	-	85,093,627	-	85,093,627
16	3,215,667,491	266,437,087	266,437,087	-	80,789,518	-	80,789,518
17	3,248,238,159	270,543,867	270,543,867	-	76,311,426	-	76,311,426
18	3,277,145,695	274,459,568	274,459,568	-	72,014,805	-	72,014,805
19	3,302,393,022	279,076,849	279,076,849	-	68,117,509	-	68,117,509
20	3,322,884,665	284,010,732	284,010,732	-	64,485,376	-	64,485,376
21	3,337,592,098	288,813,595	288,813,595	-	61,000,817	-	61,000,817
22	3,346,095,542	292,761,663	292,761,663	-	57,520,647	-	57,520,647
23	3,348,919,900	295,624,563	295,624,563	-	54,030,826	-	54,030,826
24	3,346,995,542	297,310,944	297,310,944	-	50,547,947	-	50,547,947
25	3,341,394,521	297,764,220	297,764,220	-	47,093,034	-	47,093,034
26	3,333,289,407	296,697,477	296,697,477	-	43,650,533	-	43,650,533
27	3,324,421,471	294,496,331	294,496,331	-	40,303,905	-	40,303,905
28	3,316,223,720	291,359,414	291,359,414	-	37,092,647	-	37,092,647
29	3,309,930,596	287,626,338	287,626,338	-	34,062,691	-	34,062,691
30	3,306,474,660	283,119,756	283,119,756	-	31,189,759	-	31,189,759
31	3,261,722,184	278,035,071	278,035,071	-	28,492,657	-	28,492,657
32	3,218,573,842	272,345,096	272,345,096	-	25,962,378	-	25,962,378
33	3,177,868,890	266,196,733	266,196,733	-	23,605,824	-	23,605,824

APPENDIX II

**Table 3: Actuarial Present Values of Projected Benefit Payments (cont.)**

Year	Projected Beginning Fiduciary Net Position	Projected Benefit Payments	Projected Benefit Payments		Actuarial Present Value of Projected Benefit Payments		
			Funded Portion of Benefit Payments	Unfunded Portion of Benefit Payments	Present Value of Funded Benefit Payments	Present Value of Unfunded Benefit Payments	Present Value of Benefit Payments Using the Single Discount Rate
(a)	(b)	(c)	(d)	(e)	(f) $(d) \div ((1 + 7.50\%)^{(a)+0.5})$	(g) $(e) \div ((1 + 4.31\%)^{(a)+0.5})$	(h) $(c) \div ((1 + 7.5\%)^{(a)+0.5})$
34	3,106,793,047	259,525,003	259,525,003	\$ -	21,408,547	-	21,408,547
35	3,077,901,029	252,548,384	252,548,384	-	19,379,569	-	19,379,569
36	3,054,365,344	245,249,869	245,249,869	-	17,506,521	-	17,506,521
37	3,036,823,131	237,742,754	237,742,754	-	15,786,646	-	15,786,646
38	3,025,842,063	230,133,866	230,133,866	-	14,215,255	-	14,215,255
39	3,022,057,441	222,393,150	222,393,150	-	12,778,712	-	12,778,712
40	3,026,094,639	214,575,023	214,575,023	-	11,469,286	-	11,469,286
41	3,038,643,950	206,659,694	206,659,694	-	10,275,537	-	10,275,537
42	3,060,406,100	198,685,987	198,685,987	-	9,189,831	-	9,189,831
43	3,092,125,673	190,661,350	190,661,350	-	8,203,411	-	8,203,411
44	3,134,597,191	182,590,763	182,590,763	-	7,308,061	-	7,308,061
45	3,188,664,993	174,483,843	174,483,843	-	6,496,360	-	6,496,360
46	3,255,224,633	166,352,033	166,352,033	-	5,761,486	-	5,761,486
47	3,335,223,463	158,210,136	158,210,136	-	5,097,207	-	5,097,207
48	3,429,661,524	150,075,855	150,075,855	-	4,497,802	-	4,497,802
49	3,539,592,520	141,969,752	141,969,752	-	3,958,010	-	3,958,010
50	3,666,125,648	133,914,517	133,914,517	-	3,472,963	-	3,472,963
51	3,810,428,431	125,934,112	125,934,112	-	3,038,138	-	3,038,138
52	3,973,730,553	118,053,021	118,053,021	-	2,649,310	-	2,649,310
53	4,157,328,312	110,295,935	110,295,935	-	2,302,537	-	2,302,537
54	4,362,588,791	102,688,332	102,688,332	-	1,994,159	-	1,994,159
55	4,590,956,058	95,254,836	95,254,836	-	1,720,748	-	1,720,748
56	4,843,957,651	88,019,385	88,019,385	-	1,479,109	-	1,479,109
57	5,123,211,718	81,005,067	81,005,067	-	1,266,268	-	1,266,268
58	5,430,435,630	74,233,221	74,233,221	-	1,079,452	-	1,079,452
59	5,767,455,311	67,723,365	67,723,365	-	916,083	-	916,083
60	6,136,215,691	61,492,789	61,492,789	-	773,770	-	773,770
61	6,538,792,535	55,555,984	55,555,984	-	650,295	-	650,295
62	6,977,404,853	49,924,936	49,924,936	-	543,611	-	543,611
63	7,454,427,607	44,609,745	44,609,745	-	451,848	-	451,848
64	7,972,406,015	39,617,988	39,617,988	-	373,290	-	373,290
65	8,534,070,694	34,954,961	34,954,961	-	306,376	-	306,376
66	9,142,353,531	30,624,063	30,624,063	-	249,689	-	249,689
67	9,800,405,198	26,626,359	26,626,359	-	201,948	-	201,948
68	10,511,613,971	22,960,596	22,960,596	-	161,996	-	161,996

APPENDIX II

**Table 3: Actuarial Present Values of Projected Benefit Payments (cont.)**

Year	Projected Beginning Fiduciary Net Position	Projected Benefit Payments	Projected Benefit Payments		Actuarial Present Value of Projected Benefit Payments		
			Funded Portion of Benefit Payments	Unfunded Portion of Benefit Payments	Present Value of Funded Benefit Payments	Present Value of Unfunded Benefit Payments	Present Value of Benefit Payments Using the Single Discount Rate
(a)	(b)	(c)	(d)	(e)	(f) $(d) \div ((1 + 7.50\%)^{((a)+0.5)})$	(g) $(e) \div ((1 + 4.31\%)^{((a)+0.5)})$	(h) $(c) \div ((1 + 7.5\%)^{((a)+0.5)})$
69	10,511,613,971	19,623,267	19,623,267	-	128,790	-	128,790
70	11,279,625,879	16,608,723	16,608,723	-	101,400	-	101,400
71	12,108,366,270	13,909,345	13,909,345	-	78,995	-	78,995
72	13,002,062,795	11,515,593	11,515,593	-	60,838	-	60,838
73	13,965,270,077	9,415,937	9,415,937	-	46,274	-	46,274
74	15,002,896,298	7,596,427	7,596,427	-	34,728	-	34,728
75	16,120,232,226	6,040,724	6,040,724	-	25,689	-	25,689
76	17,322,982,392	4,730,208	4,730,208	-	18,713	-	18,713
77	18,617,298,482	3,643,917	3,643,917	-	13,409	-	13,409
78	20,009,815,304	2,758,986	2,758,986	-	9,445	-	9,445
79	21,507,689,004	2,051,313	2,051,313	-	6,532	-	6,532
80	23,118,637,442	1,496,403	1,496,403	-	4,433	-	4,433
81	24,850,982,732	1,070,208	1,070,208	-	2,949	-	2,949
82	26,713,696,096	749,952	749,952	-	1,922	-	1,922
83	28,716,445,229	514,735	514,735	-	1,227	-	1,227
84	30,869,644,583	346,025	346,025	-	768	-	768
85	33,184,508,926	227,958	227,958	-	470	-	470
86	35,673,110,589	147,413	147,413	-	283	-	283
87	38,348,440,942	93,835	93,835	-	168	-	168
88	41,224,476,659	59,064	59,064	-	98	-	98
89	44,316,251,128	37,031	37,031	-	57	-	57
90	47,639,931,544	23,339	23,339	-	34	-	34
91	51,212,902,195	14,937	14,937	-	20	-	20
92	55,053,854,363	9,792	9,792	-	12	-	12
93	59,182,883,282	6,606	6,606	-	8	-	8
94	63,621,592,673	4,589	4,589	-	5	-	5
95	68,393,207,362	3,265	3,265	-	3	-	3
96	73,522,694,527	2,360	2,360	-	2	-	2
97	79,036,894,168	1,718	1,718	-	1	-	1
98	84,964,659,448	1,247	1,247	-	1	-	1
99	91,337,007,613	899	899	-	1	-	1
100	98,187,282,251	636	636	-	0	-	-
					3,034,950,056	-	3,034,950,058