



VILLAGE OF CARPENTERSVILLE
CARPENTERSVILLE FIREFIGHTERS PENSION FUND

Actuarial Valuation Report
For the Year
Beginning January 1, 2017
And Ending December 31, 2017

Timothy W. Sharpe, Actuary, Geneva, IL (630) 262-0600

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INTRODUCTION

Fire-sworn personnel of the Village of Carpentersville are covered by the Firefighters Pension Plan that is a defined-benefit, single-employer pension plan. The purpose of this report is to provide to the Intended Users of this report, specifically the Intended Users are the Village Officials, the Pension Board and the Village and Pension Board auditors, the reporting requirements of the Illinois Pension Code, the GASB Statements No. 67 & 68 financial information and related actuarial information for the year stated in this report. This report is not intended for distribution or usage to or by anyone who is not an Intended User and should not be used for any other purpose.

The valuation results reported herein are based on the employee data, plan provisions and the financial data provided by the Village. The actuary has relied on this information and does not assume responsibility for the accuracy or completeness of this information. I hereby certify that to the best of my knowledge this report is complete and accurate and fairly presents the actuarial position of the Fund in accordance with generally accepted actuarial principles and procedures. In my opinion, the assumptions used are reasonably related to the experience of the Plan and to reasonable expectations. A reasonable request for supplementary information not included in this report should be directed to the undersigned actuary.

The actuary cautions the Intended Users of the possibility of uncertainty or risks in any of the results in this report.

I, Timothy W. Sharpe, am an Enrolled Actuary and a member of the American Academy of Actuaries, and I meet the Qualifications Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

Respectfully submitted,



Timothy W. Sharpe, EA, MAAA
Enrolled Actuary No. 17-4384

5/11/2017

Date

SUMMARY OF RESULTS

There was a change with respect to Actuarial Assumptions from the prior year to reflect revised expectations with respect to mortality rates. The mortality rates have been changed to the RP 2014 Mortality Table (BCHA) projected to 2017 using improvement scale MP-2016 (previously improvement scale MP-2015).

As announced in the Mortality Improvement Scale MP-2015 Report, the Retirement Plans Experience Committee of the Society of Actuaries (RPEC) intends to publish annual updates to the RPEC_2014 model and corresponding mortality improvement scales. The resulting 2016 version of the model presented in this report reflects three additional years of historical U.S. Population mortality data (for 2012, 2013 and 2014) and modification of two input values designed to improve the model's year-over-year stability. Scale MP-2016 is based on this 2016 version of the RPEC_2014 model along with the committee-selected assumption set for 2016. For the ten years ending in 2009 the average annual age-adjusted mortality improvement rates in the United States for those between ages 50 and 95 were 1.93% for males and 1.46% for females. The corresponding averages for the five-year period ended in 2014 were 0.60% and 0.42%, respectively. As a result of this pattern, the Scale MP-2016 rates presented in this report are generally lower than Scale MP-2015 rates, which were lower than Scale MP-2014 rates.

There were no changes with respect to Plan Provisions or Actuarial Methods from the prior year.

Based on the plan sponsor's funding policy and future expected plan contributions and funded status, the plan is to be expected to produce adequate assets to make benefit payments when they are due.

The benefit payment default risk or the financial health of the plan sponsor was not deemed to be material.

Future actuarial measurements may differ significantly from the current measurements 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.

Due to the limited scope of the actuary's assignment, the actuary did not perform an analysis of the potential range of such future measurements.

SUMMARY OF RESULTS (Continued)

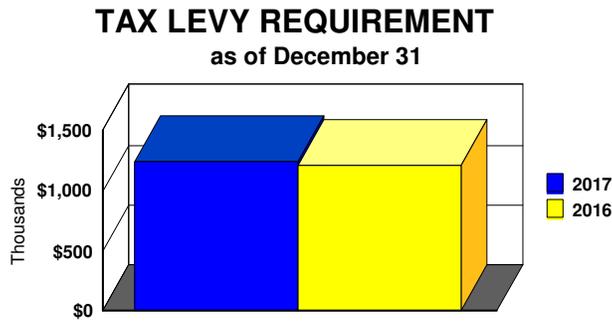
There were no unexpected changes with respect to the participants included in this actuarial valuation (0 new members, 0 terminations, 1 retirement, 1 incident of disability, annual payroll increase -4.0%, average salary increase 3.0%).

There were no unexpected changes with respect to the Fund's investments from the prior year (annual investment return 5.96%).

The Village's Tax Levy Requirement has increased slightly from \$1,213,828 last year to \$1,245,102 this year (2.6%). The slight increase in the Tax Levy is due to the increase in average salaries, the investment return was less than assumed and the new incident of disability, and was offset due to the changes to the assumptions. The Percent Funded has decreased slightly from 65.1% last year to 64.9% this year.

SUMMARY OF RESULTS (Continued)

	For Year Ending December 31	
	<u>2017</u>	<u>2016</u>
Tax Levy Requirement	\$ 1,245,102	\$ 1,213,828
	as of January 1	
	<u>2017</u>	<u>2016</u>
Village Normal Cost	608,863	637,438
Anticipated Employee Contributions	291,832	304,017
Accrued Liability	32,436,662	30,180,980
Actuarial Value of Assets	21,063,081	19,638,263
Unfunded Accrued Liability/(Surplus)	11,373,581	10,542,717
Amortization of Unfunded Accrued Liability/(Surplus)	554,784	496,981
Percent Funded	64.9%	65.1%
Annual Payroll	\$ 3,086,539	\$ 3,215,405

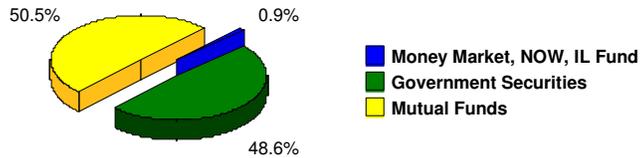


ACTUARIAL VALUATION OF ASSETS

		as of January 1	
		<u>2017</u>	<u>2016</u>
Money Market, NOW, IL Fund	\$	189,128	\$ 284,425
Government Securities		9,800,060	9,160,919
Mutual Funds		10,192,170	9,238,922
Interest Receivable		54,103	54,607
Miscellaneous Receivable/(Payable)		<u>(13,188)</u>	<u>(17,895)</u>
Market Value of Assets		<u>20,222,274</u>	<u>18,720,979</u>
Actuarial Value of Assets	\$	21,063,081	19,638,263

FYE 2013-2016 (Gain)/Loss: \$218,332; \$20,156; \$1,052,676; \$196,841

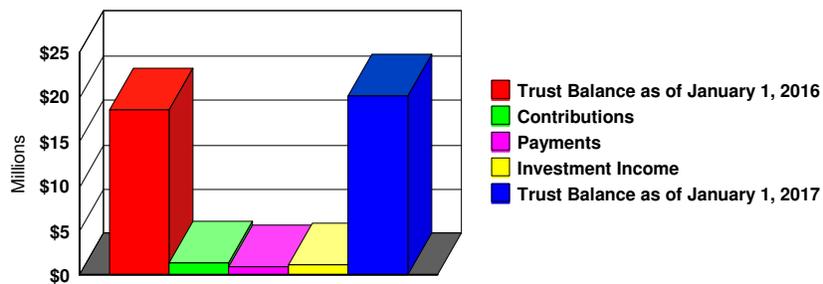
SUMMARY OF ASSETS
As Of January 1, 2017



ASSET CHANGES DURING PRIOR YEAR

Trust Balance as of January 1, 2016		\$	18,720,979
Contributions			
Village	1,107,232		
Employee	<u>299,097</u>		
Total			1,406,328
Payments			
Benefit Payments	989,209		
Expenses	<u>42,562</u>		
Total			1,031,770
Investment Income			<u>1,126,737</u>
Trust Balance as of January 1, 2017		\$	<u>20,222,274</u>
Approximate Annual Rate of Return			5.96%

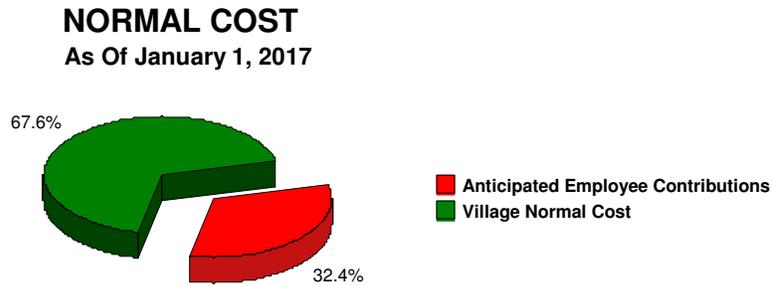
ASSET CHANGES DURING PRIOR YEAR



NORMAL COST

The Normal Cost is the actuarial present value of the portion of the projected benefits that are expected to accrue during the year based upon the actuarial valuation method and actuarial assumptions employed in the valuation.

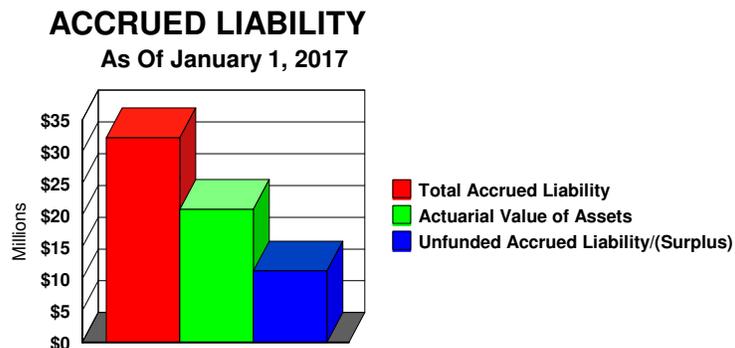
	as of January 1	
	<u>2017</u>	<u>2016</u>
Total Normal Cost	\$ 900,695	\$ 941,455
Anticipated Employee Contributions	<u>291,832</u>	<u>304,017</u>
Village Normal Cost	<u>608,863</u>	<u>637,438</u>
Normal Cost Payroll	\$ 3,086,539	\$ 3,215,405
Village Normal Cost Rate	19.73%	19.82%
Total Normal Cost Rate	29.18%	29.28%



ACCRUED LIABILITY

The Accrued Liability is the actuarial present value of the portion of the projected benefits that has been accrued as of the valuation date based upon the actuarial valuation method and actuarial assumptions employed in the valuation. The Unfunded Accrued Liability is the excess of the Accrued Liability over the Actuarial Value of Assets.

	as of January 1	
Accrued Liability	<u>2017</u>	<u>2016</u>
Active Employees	\$ 15,680,372	\$ 15,962,875
Children Annuities	6,958	7,977
Disability Annuities	5,718,340	4,848,569
Retirement Annuities	10,305,756	8,985,538
Surviving Spouse Annuities	302,300	311,144
Terminated Vested Annuities	<u>422,936</u>	<u>64,877</u>
Total Annuities	16,756,290	14,218,105
Total Accrued Liability	32,436,662	30,180,980
Actuarial Value of Assets	<u>21,063,081</u>	<u>19,638,263</u>
Unfunded Accrued Liability/(Surplus)	\$ <u>11,373,581</u>	\$ <u>10,542,717</u>
Percent Funded	64.9%	65.1%

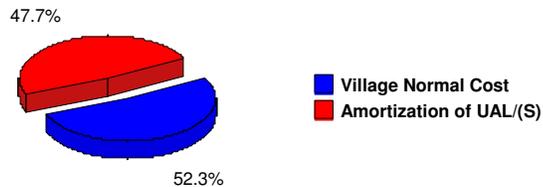


TAX LEVY REQUIREMENT

The Public Act 096-1495 Tax Levy Requirement is determined as the annual contribution necessary to fund the normal cost, plus the amount to amortize the excess (if any) of ninety percent (90%) of the accrued liability over the actuarial value of assets as a level percentage of payroll over a thirty (30) year period which commenced in 2011, plus an adjustment for interest. The 100% amortization amount is equal to the amount to amortize the unfunded accrued liability as a level percentage of payroll over a thirty (30) year period which commenced in 2011.

	For Year Ending December 31	
	<u>2017</u>	<u>2016</u>
Village Normal Cost as of Beginning of Year	\$ 608,863	\$ 637,438
Amortization of Unfunded Accrued Liability/(Surplus)	554,784	496,981
Interest for One Year	<u>81,455</u>	<u>79,409</u>
Tax Levy Requirement as of End of Year	\$ <u>1,245,102</u>	\$ <u>1,213,828</u>
 Public Act 096-1495 Tax Levy Requirement		
1) Normal Cost (PUC)	700,530	726,940
2) Accrued Liability (PUC)	30,340,210	28,170,703
3) Amortization Payment	304,528	269,421
4) Interest for One Year	70,354	69,745
5) PA 096-1495 Tax Levy Requirement (1 + 3 + 4)	\$ 1,075,412	1,066,106

TAX LEVY REQUIREMENT For Fiscal Year Ending December 31, 2017



SUMMARY OF PLAN PARTICIPANTS

The actuarial valuation of the Plan is based upon the employee data furnished by the Village.
 The information provided for Active participants included:

- Name
- Sex
- Date of Birth
- Date of Hire
- Compensation
- Employee Contributions

The information provided for Inactive participants included:

- Name
- Sex
- Date of Birth
- Date of Pension Commencement
- Monthly Pension Benefit
- Form of Payment

Membership	<u>2017</u>	<u>2017</u>	<u>2016</u>	<u>2016</u>
Current Employees				
Vested	20		21	
Nonvested	<u>15</u>		<u>16</u>	
Total	<u>35</u>		<u>37</u>	
Inactive Participants		<u>Annual Benefits</u>		<u>Annual Benefits</u>
Children	6 \$	1,773	6 \$	1,721
Disabled Employees	7	334,313	6	272,944
Retired Employees	11	698,279	9	605,127
Surviving Spouses	1	30,056	1	30,056
Terminated Vesteds	<u>3</u>	<u>23,635</u>	<u>3</u>	<u>23,635</u>
Total	<u>28</u>	<u>1,088,056</u>	<u>25</u>	<u>933,483</u>
Annual Payroll	\$	3,086,539	\$	3,215,405

SUMMARY OF PLAN PARTICIPANTS (Continued)

Age and Service Distribution

Service Age	0-4	5-9	10-14	15-19	20-24	25-29	30+	Total	Salary
20-24									
25-29		3						3	71,051
30-34	1	3						4	81,922
35-39		6	4	4				14	86,720
40-44		1	1	2				4	97,526
45-49		1	2	2	1	1		7	91,749
50-54				1		1		2	102,409
55-59				1				1	94,456
60+									
Total	<u>4</u>	<u>11</u>	<u>7</u>	<u>10</u>	<u>1</u>	<u>2</u>	<u>0</u>	<u>35</u>	<u>88,187</u>
Salary	d	84,447	86,712	95,648	112,415	99,223			

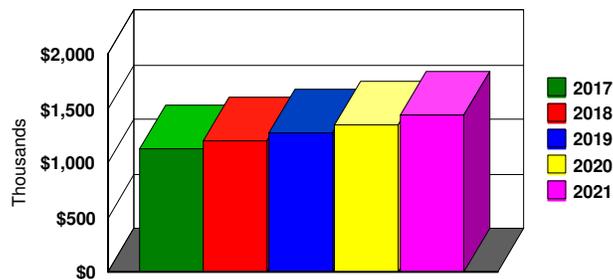
Average Age: 39.7 Average Service: 11.8 Average Future Service: 12.8

DURATION (years) Active Members: 20.3 Retired Members: 12.2 All Members: 16.1

PROJECTED PENSION PAYMENTS

<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>	<u>2021</u>
\$1,133,878	\$1,211,205	\$1,288,240	\$1,346,562	\$1,437,133

PROJECTED PENSION PAYMENTS
2017-2021



SUMMARY OF PLAN PROVISIONS

The Plan Provisions have not been changed from the prior year.

The Village of Carpentersville Firefighters Pension Fund was created and is administered as prescribed by "Article 4. Firefighters' Pension Fund - Municipalities 500,000 and Under" of the Illinois Pension Code (Illinois Compiled Statutes, 1992, Chapter 40). A brief summary of the plan provisions is provided below.

Employees attaining the age of (50) or more with (20) or more years of creditable service are entitled to receive an annual retirement benefit of one-half of the salary attached to the rank held on the last day of service. The pension shall be increased by (1/12) of (2.5%) of such monthly salary for each additional month of service over (20) years up to (30) years, to a maximum of (75%) of such monthly salary.

Employees with at least (10) years but less than (20) years of credited service may retire at or after age (60) and receive a reduced benefit ranging from (15%) of final salary for (10) years of service to (45.6%) for 19 years of service.

Surviving spouses receive (100%) of final salary for fatalities resulting from an act of duty, or otherwise the greater of (54%) of final salary or the monthly retirement pension that the deceased firefighter was receiving at the time of death. Surviving children receive (12%) of final salary. The maximum family survivor benefit is (75%) of final salary.

Employees disabled in the line of duty receive (65%) of final salary.

The monthly pension of a covered employee who retired with (20) or more years of service after January 1, 1977, shall be increased annually, following the first anniversary date of retirement and be paid upon reaching the age of at least (55) years, by (3%) of the amount of the pension payable at the time of the increase.

Employees are required to contribute (9.455%) of their base salary to the Firefighters' Pension Plan. If an employee leaves covered employment with less than twenty (20) years of service, accumulated employee contributions may be refunded without accumulated interest.

For Employees hired after January 1, 2011, the annual retirement benefit is (2.5%) of final average salary for each year of service up to (30) years, to a maximum of (75%) of such salary, the Normal Retirement age is attainment of age 55 and completion of 10 years of service; Early Retirement age is attainment of age 50, completion of 10 years of service and the Early Retirement Factor is 6% per year; the Employee's Accrued Benefit is based on the Employee's final 8-year average salary not to exceed \$106,800 (as indexed); Cost-of-living adjustments are simple increases (not compounded) of the lesser of 3% or 50% of CPI beginning the later of the anniversary date and age 60; Surviving Spouse's Benefits are 66 2/3% of the Employee's benefit at the time of death.

ACTUARIAL METHODS

The Actuarial Methods employed for this valuation are as follows:

Projected Unit Credit Cost Method (for years beginning on or after 2011 for PA 096-1495)

Under the Projected Unit Credit Cost Method, the Normal Cost is the present value of the projected benefit (including projected salary increases) earned during the year.

The Accrued Liability is the present value of the projected benefit (including projected salary increases) earned as of the actuarial valuation date. The Unfunded Accrued Liability is the excess of the Accrued Liability over the plan's assets. Experience gains or losses adjust the Unfunded Accrued Liability.

Entry Age Normal Cost Method

Under the Entry Age Normal Cost Method the Normal Cost for each participant is computed as the level percentage of pay which, if paid from the earliest age the participant is eligible to enter the plan until retirement or termination, will accumulate with interest to sufficiently fund all benefits under the plan. The Normal Cost for the plan is determined as the greater of a) the sum of the Normal Costs for all active participants, and b) 17.5% of the total payroll of all active participants.

The Accrued Liability is the theoretical amount that would have accumulated had annual contributions equal to the Normal Cost been paid. The Unfunded Accrued Liability is the excess of the Accrued Liability over the plan's assets. Experience gains or losses adjust the Unfunded Accrued Liability.

ACTUARIAL ASSUMPTIONS

The Actuarial Assumptions used for determining the Tax Levy Requirement and GASB Statements No. 67 & 68 Disclosure Information are the same (except where noted) and have been changed from the prior year (discussion on page 4). The methods and assumptions disclosed in this report may reflect statutory requirements and may reflect the responsibility of the Principal and its advisors. Unless specifically noted otherwise, each economic and demographic assumption was selected in accordance with Actuarial Standards of Practice 27 and 35 and may reflect the views and advice of advisors to the Principal. In the event a method or assumption conflicts with the actuary's professional judgment, the method or assumption is identified in this report. The Actuarial Assumptions employed for this valuation are as follows:

Valuation Date	January 1, 2017
Asset Valuation Method	5-year Average Market Value (PA 096-1495)
Investment Return	7.00% net of investment expenses.
Salary Scale	5.50%
Mortality	RP 2014 Mortality Table (BCHA) projected to 2017 using improvement scale MP-2016.
Withdrawal	Based on studies of the Fund and the Department of Insurance, Sample Rates below
Disability	Based on studies of the Fund and the Department of Insurance, Sample Rates below
Retirement	Based on studies of the Fund and the Department of Insurance, Sample Rates below (100% by age 70)
Marital Status	80% Married, Female spouses 3 years younger

ACTUARIAL ASSUMPTIONS (Continued)

Sample Annual Rates Per 100 Participants

<u>Age</u>	<u>Withdrawal</u>	<u>Disability</u>	<u>Retirement</u>
20	9.00	0.10	
25	5.00	0.10	
30	2.50	0.20	
35	2.00	0.35	
40	1.00	0.50	
45	1.00	0.65	
50	1.00	1.00	14.00
55	1.00	1.50	20.00
60	1.00	3.00	25.00
65	1.00	4.25	50.00
70			100.00

STATEMENTS NO. 67 & 68 DISCLOSURE INFORMATION

Plan Membership	December 31, 2016
Inactive plan members or beneficiaries currently receiving benefits	25
Inactive plan members entitled to but not yet receiving benefits	3
Active plan members	<u>35</u>
Total	<u>63</u>

Net Pension Liability of the Village	
Total pension liability	32,436,662
Plan fiduciary net position	20,222,274
Village's net pension liability	12,214,388
Plan fiduciary net position as a percentage of the total pension liability	62.34%

Actuarial Assumptions	
Inflation	2.50%
Salary increases	5.50%
Investment rate of return	7.00% net of expenses

The projection of cash flows used to determine the discount rate assumed that plan member contributions will be made at the current contribution rate and that Village contributions will be made at rates equal to the difference between actuarially determined contribution rates and the member rate. Based on those assumptions, the pension plan's fiduciary net position was projected to be available to make all projected future benefit payments of current members. Therefore, the long-term expected rate of return on pension plan investments was applied to all periods of projected benefit payments to determine the total pension liability.

Sensitivity of the Net Pension Liability to Changes in the Discount Rate			
	1% Decrease	Current Discount Rate	1% Increase
	6.00%	7.00%	8.00%
Net Pension Liability	17,098,039	12,214,388	8,214,982

STATEMENTS NO. 67 & 68 DISCLOSURE INFORMATION (continued)

Schedule of Changes in the Village's Net Pension Liability and Related Ratios

	December 31, 2016
Total Pension Liability	
Service cost	1,007,357
Interest	2,078,046
Changes of benefit terms	0
Differences between expected and actual experience	453,352
Changes of assumptions	(293,864)
Benefit payments, including refunds of member contributions	989,209
Net change in total pension liability	2,255,682
Total pension liability - beginning	30,180,980
Total pension liability - ending	32,436,662
 Plan Fiduciary Net Position	
Contributions - employer	1,107,232
Contributions - member	299,097
Net investment income	1,126,737
Benefit payments, including refunds of member contributions	989,209
Administrative expense	42,562
Other	0
Net change in plan fiduciary net position	1,501,295
Plan fiduciary net position - beginning	18,720,979
Plan fiduciary net position - ending	20,222,274
 Village's net pension liability	 12,214,388
 Plan fiduciary net position as a percentage of the total pension liability	 62.34%
 Covered-employee payroll	 3,086,539
 Village's net pension liability as a percentage of covered-employee payroll	 395.73%

STATEMENTS NO. 67 & 68 DISCLOSURE INFORMATION (continued)

Schedule of Village Contributions

	December 31, 2016
Actuarially determined contribution	722,056
Contributions in relation to the actuarially determined contribution	1,107,232
Contribution deficiency (Excess)	(385,176)
Covered-employee payroll	3,086,539
Contributions as a percentage of covered-employee payroll	35.87%

Notes to schedule

Valuation date December 31, 2016

Methods and assumptions used to determine contribution rates:

Actuarial cost method	Entry Age Normal
Amortization method	Level Percentage of Pay
Remaining amortization period	24 years
Asset valuation method	Market Value
Inflation	2.50%
Salary increases	5.50%
Investment rate of return	7.00%
Retirement age	50-70
Mortality	RP 2014 projected to 2017
Other	

Mortality rates were based on the RP 2014 Mortality Table (BCHA) projected to 2017 using improvement scale MP-2016. The other non-economic actuarial assumptions used in the December 31, 2016 valuation were based on the results of an actuarial experience study conducted by the Illinois Department of Insurance dated September 26, 2012.