FIREFIGHTERS' RETIREMENT SYSTEM

ACTUARIAL VALUATION AS OF
JUNE 30, 2019

G. S. CURRAN & COMPANY, LTD.

Actuarial Services

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November 6, 2019

Board of Trustees
Firefighters' Retirement System
3100 Brentwood Drive
Baton Rouge, LA 70809

Gentlemen:

We are pleased to present our report on the actuarial valuation of the Firefighters' Retirement System for the fiscal year ending June 30, 2019. Our report is based on the actuarial assumptions specified and relies on the data supplied by the system's administrators and accountants. This report was prepared at the request of the Board of Trustees of Firefighters' Retirement System of the State of Louisiana. The primary purpose of this report is to determine the actuarially required contribution for the retirement system for the fiscal year ending June 30, 2020 and to recommend the net direct employer contribution rate for Fiscal 2021. This report does not contain the information necessary for accounting disclosures as required by Governmental Accounting Standards Board (GASB) Statements 67 and 68; that information is included in a separate report. This report was prepared exclusively for Firefighters' Retirement System for a specific limited purpose. It is not for the use or benefit of any third party for any purpose.

In our opinion, all of the assumptions on which this valuation is based are reasonable individually and in the aggregate. Both economic and demographic assumptions are based on our expectations for future experience for the fund. This report has been prepared in accordance with generally accepted actuarial principles and practices, and to the best of our knowledge and belief, fairly reflects the actuarial present values and costs stated herein. The undersigned actuaries are members of the American Academy of Actuaries and have met the qualification standards for the American Academy of Actuaries to render the actuarial opinions incorporated in this report, and are available to provide further information or answer any questions with respect to this valuation.

Sincerely,

G. S. CURRAN & COMPANY, LTD.

By: _____ _____

Gary Curran, F.C.A., M.A.A.A., A.S.A. Gregory Curran, F.C.A., M.A.A.A., A.S.A.

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SUMMARY OF VALUATION RESULTS
FIREFIGHTERS' RETIREMENT SYSTEM

Valuation Date:		June 30, 2019	June 30, 2018
Census Summary:	Active Members	4,446	4,424
	Retired Members and Survivors	2,407	2,327
	DROP Participants	208	192
	Terminated Due a Deferred Benefit	84	76
	Terminated Due a Refund	671	656
Payroll (excluding DROP participants):		$ 240,413,972	$ 236,005,445
Benefits in Payment (excluding DROP accruals):		$ 97,547,088	$ 91,808,883
Present Value of Future Benefits		$ 3,001,464,309	$ 2,866,047,701
Actuarial Accrued Liability (EAN):		$ 2,405,122,324	$ 2,279,256,967
Unfunded Actuarial Accrued Liability:		$ 584,081,420	$ 537,805,006
Actuarial Value of Assets (AVA):		$ 1,821,040,904	$ 1,741,451,961
Market Value of Assets (MVA):		$ 1,778,931,314	$ 1,704,049,168
Ratio of AVA to Actuarial Accrued Liability:		75.72%	76.40%

	Fiscal 2019	Fiscal 2018
Market Rate of Return:	4.4%	6.5%
Actuarial Rate of Return:	4.5%	5.6%

	Fiscal 2020	Fiscal 2019
Employers' Normal Cost (Mid-year):	$ 35,708,523	$ 34,904,077
Amortization Cost (Mid-year):	$ 68,606,220	$ 58,710,108
Estimated Administrative Cost:	$ 1,937,980	$ 1,975,435
Projected Insurance Premium Taxes Due:	$ 28,017,672	$ 26,807,631
Net Direct Employer Actuarially Required Contributions:	$ 78,235,051	$ 68,781,989
Projected Payroll:	$ 246,180,693	$ 242,900,383
Statutory Employee Contribution Rate: *	10.00%	10.00%
Board Approved Net Direct Employer Contribution Rate: *	27.75%	26.50% †
Actuarially Required Net Direct Employer Contribution Rate: *	31.78%	28.32%

	Fiscal 2021	Fiscal 2020
Minimum Recommended Net Direct Employer Cont. Rate: *	32.25%	27.75%

* The above rates are for members with earnings greater than the Department of HHS poverty guidelines. For members with earnings below the poverty guidelines, employer rates will be 2.0% higher and employee rates will be 2.0% lower.

† The Board elected to set the Net Direct Employer Contribution Rate higher than the 26.25% minimum recommended rate

GENERAL COMMENTS

The values and calculations in this report were determined by applying statistical analysis and projections to system data and the assumptions listed. There is sometimes a tendency for readers to either dismiss results as mere "guesses" or alternatively to ascribe a greater degree of accuracy to the results than is warranted. In fact, neither of these assessments is valid. Actuarial calculations by their very nature involve estimations. As such, it is likely that eventual results will differ from those presented. The degree to which such differences evolve will depend on several factors including the completeness and accuracy of the data utilized, the degree to which assumptions approximate future experience, and the extent to which the mathematical model accurately describes the plan's design and future outcomes.

Data quality varies from system to system and year to year. The data inputs involve both asset information and census information of plan participants. In both cases, the actuary must rely on third parties; nevertheless, steps are taken to reduce the probability and degree of errors. The development of assumptions is primarily the task of the actuary; however, information and advice from plan administrators, staff, and other professionals may be factored into the formation of assumptions. The process of setting assumptions is based primarily on analysis of past trends, but modification of historical experience is often required when the actuary has reason to believe that future circumstances may vary significantly from the past. Setting assumptions includes but is not limited to collecting past plan experience and studying general population demographics and economic factors from the past. The actuary will also consider current and future macro-economic and financial expectations as well as factors that are likely to impact the particular group under consideration. Hence, assumptions will also reflect the actuary's judgment with regard to future changes in plan population and decrements in view of the particular factors which impact participants. Thus, the process of setting assumptions is not mere "guess work" but rather a process of mathematical analysis of past experience and of those factors likely to impact the future.

One area where the actuary is limited in his ability to develop accurate estimates is the projection of future investment earnings. The difficulties here are significant. First, the future is rarely like the past, and the data points available to develop stochastic trials are far fewer than the number required for statistical significance. In this area, some guess work is inevitable. However, there are tools available to lay a foundation for making estimates with an expectation of reliability. Although past data is limited, that which is available is likely to provide some insight into the future. This data consists of general economic and financial values such as past rates of inflation, rates of return variance, and correlations of returns among various asset classes along with the actual asset experience of the plan. In addition, the actuary can review the current asset market environment as well as economic forecasts from governmental and investment research groups to form a reasonable opinion with regard to probable future investment experience for the plan.

All of the above efforts would be in vain if the assumption process was static, and the plan would have to deal with the consequences of actual experience differing from assumptions after forty or fifty years of compounded errors. However, actuarial funding methods for pension plans all allow for periodic corrections of assumptions to conform with reality as it unfolds. This process of repeated correction of estimates produces results which although imperfect are nevertheless a reasonable approach to determine the contribution levels which will provide for the future benefits of plan participants.

COMMENTS ON DATA

For the valuation, the administrator of the system furnished a census in electronic format derived from the system's master data processing file indicating each active covered employee's sex, date of birth, service credit, annual salary, and accumulated contributions. Information on retirees detailing dates of birth of retirees and beneficiaries, as well as option categories and benefit amounts, was provided in like manner. In addition, data was supplied on former employees who are vested or who have contributions remaining on deposit. As illustrated in Exhibit VIII, there are 4,446 active contributing members in the system of whom 2,090 have vested retirement benefits; in addition, there are 208 participants in the Deferred Retirement Option Plan (DROP); 2,407 former members or their beneficiaries are receiving retirement benefits. An additional 755 terminated members have contributions remaining on deposit with the system; of this number 84 have vested rights for future retirement benefits. All individuals submitted were included in the valuation.

Census data submitted to our office is tested for errors. Several types of census data errors are possible; to ensure that the valuation results are as accurate as possible, a significant effort is made to identify and correct these errors. In order to minimize coverage errors (i.e., missing or duplicated individual records) the records are checked for duplicates, and a comparison of the current year's records to those submitted in prior years is made. Changes in status, new records, and previous records, which have no corresponding current record, are identified. This portion of the review indicates the annual flow of members from one status to another and is used to check some of the actuarial assumptions, such as retirement rates, rates of withdrawal, and mortality. In addition, the census is checked for reasonableness in several areas, such as age, service, salary, and current benefits. The records identified by this review as questionable are checked against data from prior valuations; those not recently verified are included in a detailed list of items sent to the system's administrative staff for verification and/or correction. Once the identified data has been researched and verified or corrected, it is returned to us for use in the valuation. Occasionally some requested information is either unavailable or impractical to obtain. In such cases, values may be assigned to missing data. The assigned values are based on information from similar records or based on information implied from other data in the record.

In addition to the statistical information provided on the system's participants, the system's administrator furnished general information related to other aspects of the system's expenses, benefits and funding. Valuation asset values as well as income and expenses for the fiscal year were based on information furnished by the Louisiana Legislative Auditor's office. As indicated in the system's financial statements, the net market value of the system's assets was $1,778,931,314 as of June 30, 2019. Net investment income for Fiscal 2019 measured on a market value basis was $74,259,733. Contributions to the system for the fiscal year totaled $116,250,324; benefits and expenses amounted to $115,627,911.

Notwithstanding our efforts to review both census and financial data for apparent errors, we must rely upon the system's administrative staff and accountants to provide accurate information. Our review of submitted information is limited to validation of reasonableness and consistency. Verification of submitted data to source information is beyond the scope of our efforts.

COMMENTS ON ACTUARIAL METHODS AND ASSUMPTIONS

Prior to the 2019 actuarial valuation, all valuations of the Firefighters' Retirement System were based on the Entry Age Normal actuarial cost method. As of June 30, 1989, under the provisions of Louisiana R.S. 11:103, the funding excess for the plan which was determined to be $239,425 was amortized over thirty years. Subsequent experience gains and losses were amortized over fifteen years. Contribution gains or losses arising from contributions in excess of or less than the required contributions were amortized over the same period as experience gains and losses. Further changes in the unfunded accrued liability generated by mergers of groups of firefighters into the system were amortized over thirty years. Act 620 of the 2003 Regular Session of the Louisiana Legislature changed the amortization of unfunded accrued liability. All non-merger amortization bases in existence on June 30, 2002, were combined, offset, and re-amortized through June 30, 2029, in accordance with R.S. 11:103(D). The aggregate value of the bases as of that date was $175,578,584. Act 422 of the 2009 Regular Session of the Louisiana Legislature further changed the amortization of unfunded accrued liability. Beginning with Fiscal 2010, actuarial gains and losses, as well as contribution gains and losses, were amortized over a 20 year period. Each year thereafter, the amortization period was set to decrease by one year until attaining a 15 year amortization period. All changes in assumptions or the method of valuing assets are amortized over 15 years. All amortization payments were set on a level dollar basis. Act 91 of the 2019 Regular Session of the Louisiana Legislature changed the funding method for use in actuarial valuations of the Firefighters' Retirement System from the Entry Age Normal actuarial cost method to the Frozen Initial Liability actuarial cost method. This change was effective with the 2019 valuation. Based upon this change, all outstanding balances other than merger bases on the system's entry age normal unfunded actuarial accrued liability as of June 30, 2019 were frozen, combined, and reamortized over a fifteen year period with payments set to decrease by one percent each year. All the then existing individual merger bases were frozen and amortized over their respective remaining periods. With this change, all actuarial experience gains and losses, contribution gains and losses, gains and losses arising from changes in benefits, and gains and losses arising from changes in assumptions which occur in fiscal years after 2019 will be included in the calculation of the plan's normal cost according to the Frozen Initial Liability funding method.

Since the Frozen Initial Liability funding method spreads actuarial gains and losses over future normal costs, favorable plan experience will lower future normal costs while unfavorable plan experience will increase future normal costs. Overall costs may increase or decrease depending on payroll growth. Since payments on the non-merger frozen unfunded accrued liability are set to decrease by one percent per year over the next fifteen years, future amortization payments will remain level as a percentage of payroll should system payroll decrease by one percent per year. Any reduction in payroll less than one percent or any increase in payroll will decrease the amortization costs as a percentage of payroll. Payroll reductions of greater than one percent will increase the amortization costs as a percentage of payroll. Required payments on merger bases do not directly affect the net direct employer contribution since funds for these payments come directly from insurance premium taxes.

In February of 2017, a recommendation was made to the Board of Trustees to reduce the long-term rate of return assumption. The recommendation was formed after an analysis of the system's portfolio along with expected long-term rates of return, standard deviations of return, and correlations between asset classes collected from a number of investment consulting firms in addition to the system's investment consultants, New England Pension Consultants. Based on this analysis and after discussions with the Board, a plan was approved to reduce the 7.5% valuation interest rate in effect for the Fiscal 2016 actuarial valuation to 7.0% over the subsequent five actuarial valuations with reductions of 0.10% each year, beginning with the June 30, 2017 valuation. Under this schedule, the

Fiscal 2019 actuarial valuation was to be run at a 7.2% valuation interest rate. Prior to the completion of this valuation, a review of the valuation interest rate for Fiscal 2019 was performed based upon an update to the G. S. Curran & Company Consultant Average Capital Market Assumptions for 2019 and an update to the actuary's reasonable range for the assumed rate of return. To determine the reasonable range, the actuary computed an expected long-term portfolio return and standard deviation based upon the system's target asset allocation and a thirty year time horizon. Based upon the results of this study, ten thousand stochastic trials were run to determine a reasonable range around the plan's expected long-term portfolio rate of return. The review found that the scheduled rate of 7.20% was no longer inside the reasonable range. Therefore, the assumed rate of return for the Fiscal 2019 valuation was further reduced to 7.15%, which was found to lie within the actuary's reasonable range.

The system's reductions in the valuation interest have been in part based upon a reduction in the expected long-term inflation rate. Therefore, the assumed long-term inflation rate has also been reduced over the same period. For 2019, an assumed rate of inflation of 2.5% was implicit in the assumed rate of return. After reviewing the cumulative reductions in the valuation interest rate over the past three years (ie 0.35%) and considering the recommendation that the Fiscal 2019 actuarial valuation be run at a valuation interest rate lower than the Board's original reduction schedule, a decision was made to perform an interim review of the plan's salary scale assumption. Based upon this review, it was determined that it would be appropriate to reduce the plan's salary scale by 0.25% at each duration until a complete review is performed in the system's next experience study scheduled for the upcoming fiscal year. The remaining actuarial assumptions utilized for this report are based on the results of an actuarial experience study for the period July 1, 2009 – June 30, 2014, unless otherwise specified in this report. Additional details are given in the complete Experience Report for fiscal years 2010 through 2014.

Although the Board of Trustees has authority to grant ad hoc Cost of Living Increases (COLAs) under limited circumstances, these COLAs have not been shown to have a historical pattern, the amounts of the COLAs have not been relative to a defined cost-of-living or inflation index, and there is no evidence to conclude that COLAs will be granted on a predictable basis in the future. Therefore, for purposes of determining the present value of benefits, these COLAs were deemed not to be substantively automatic and the present value of benefits excludes COLAs not previously granted by the Board of Trustees.

The current year actuarial assumptions utilized for the report are outlined on pages forty-two through forty-five. All assumptions used are based on estimates of future long-term experience for the fund. All calculations, recommendations, and conclusions are based on the assumptions specified. To the extent that prospective experience differs from that assumed, adjustments to contribution levels will be required. Such differences will be revealed in future actuarial valuations. The net effect of the changes in assumptions was $28,739,403 which increased the interest-adjusted amortization payments on the system's UAL by $3,104,177 which corresponds to payments of 1.26% of Fiscal 2020 projected payroll.

RISK FACTORS

Defined benefit pension plans are subject to a number of risks. These can be related either to plan assets or liabilities. In order to pay benefits, the plan must have sufficient assets. Several factors can lead to asset levels which are below those required to pay promised benefits. The first risk in this

regard is the failure to contribute adequate funds to the plan. In some ways, this is the greatest risk, since other risks can usually be addressed by adequate actuarial funding.

All pension plans are subject to asset performance risk. Asset performance is comprised of the real rates of return earned on the portfolio of investments plus the underlying inflation rate. High levels of inflation or deflation can present the plan with problems by either reducing the purchasing power of plan benefits or impairing asset values in the trust. Asset performance over the long run depends not only on average returns but also on the volatility of returns. Two portfolios of identical size with identical average rates of return will accumulate different levels of assets if the volatility of returns differs since increased volatility reduces the accumulation of assets. Another element of asset risk is reinvestment risk. Interest rate declines can subject pension plans to an increase in this risk. As fixed income securities mature, investment managers may be forced to reinvest funds at decreasing rates of return. For pension plans which require significant net cash flow above contributions to fund benefit payments, the risk of insufficient liquidity is another risk component which can create problems if it becomes necessary to sell securities under unfavorable market conditions in order to raise cash necessary to pay retirement benefits. Even for individual securities, insolvency and performance risk can subject a plan to stress if these investments comprise a significant portion of plan assets. Security insolvency or severe underperformance can result in steep increases in sponsor contributions where individual investments comprise more than a de minimis amount of the investment portfolio.

In addition to asset risk, the plan is also subject to risks related to liabilities. These risks include longevity risk (the risk that retirees will live longer than expected), termination risk (the risk that fewer than the anticipated number of members will terminate service prior to retirement), and other factors that may have an impact on the liability structure of the plan. Final average compensation plans are vulnerable to unexpectedly large increases in salary for individual members near retirement. Conversely, in cases where plans have large unfunded liabilities, payroll contraction is a risk insofar as contributions which are typically reported as a percentage of payroll may increase as payrolls decline.

Liability risk also includes items such as data errors. Significant errors in plan data can distort or disguise plan liabilities. When data corrections are made, the plan may experience unexpected increases or decreases in liabilities. Even natural disasters and dislocations in the economy or other unforeseen events can present risks to the plan. These events can affect member payroll and plan demographics, both of which impact costs.

Recommended actuarial contributions are based on expectations related to asset and liability performance; all of the above mentioned factors can produce unexpected changes in the future cost structures of the plan. For this reason, future costs may differ significantly from current levels. Ordinarily, variations in these factors will offset to some extent. However, even with the expectation that not all variations in costs will likely travel in the same direction, certain factors have the potential on their own accord to pose a significant risk to future cost levels and solvency.

Beyond identifying risk categories, it is possible to quantify some risk factors. One fairly well known risk metric is the funded ratio of the plan. The rate is given as plan assets divided by plan liabilities. However, the definition of each of these terms may vary. The two typical alternatives used for assets are the market and actuarial value of assets. There are a number of alternative measures of liability depending on the funding method employed. The Governmental Accounting Standards Board (GASB) specifies that for financial reporting purposes, the funded ratio is determined by using the market value of assets divided by the entry age normal accrued liability. This value is given in the system's financial report. Alternatively, we have calculated the ratio of the actuarial value of assets to the entry age

normal accrued liability based on the funding methodology used to fund the plan. The ratio is 75.72% as of June 30, 2019. This value gives some indication of the financial strength of the plan; however, it does not guarantee the ability of the fund to pay benefits in the future or indicate that in the future, contributions are likely to be less than or greater than current contributions. In addition, the ratio cannot be used in isolation to compare the relative strength of different retirement systems. However, the trend of this ratio over time can give some insight into the financial health of the plan. Even in this regard, caution is warranted since market fluctuations in asset values and changes in plan assumptions can distort underlying trends in this value. One additional risk measure is the sensitivity of the plan's cost structure to asset gains and losses. For this plan, we have determined that based on current assets and demographics, for each percentage under (over) the assumed rate of return on the actuarial value of assets, there will be a corresponding increase (reduction) in the actuarially required contribution as a percentage of projected payroll of 0.75% for the fund.

The ability of a system to recover from adverse asset or liability performance is related to the maturity of the plan population. In general, plans with increasing active membership are less sensitive to asset and liability gains and losses than mature plans since changes in plan costs can be partially allocated to new members. If the plan has a large number of active members compared to retirees, asset or liability losses can be more easily addressed. As more members retire, contributions can only be collected from a smaller segment of the overall plan population. Often, population ratios of actives to annuitants are used to measure the plan's ability to adjust or recover from adverse events since contributions are made by or on behalf of active members but not for retirees. Thus, if the plan suffers a mortality loss through increased longevity, this will affect both actives and retirees, but the system can only fund this loss by contributions related to active members. A measure of risk related to plan maturity is the ratio of total benefit payments to active payroll. For Fiscal 2019, this ratio is 41%; ten years ago this ratio was 30%.

One other area of risk is the risk that plan assumptions will need to be revised to conform to changing actual or expected plan experience. Such assumption revisions could relate to demographic or economic factors. With regard to the economic assumptions, we have determined that a reduction in the valuation interest rate by 1% (without any change to other collateral factors) would increase the actuarially required employer contribution rate for Fiscal 2020 by 15.54% of payroll.

There is a risk that future actuarial measurements may differ significantly from current measurements presented in this report due to factors such as the following: plan experience differing from that anticipated by the economic or demographic assumptions, changes in economic or demographic assumption, completion of amortization payment schedules, and changes in plan provisions or applicable law. Analysis of the effect of all these factors and additional risk metrics is beyond the scope of this report.

CHANGES IN PLAN PROVISIONS

The following changes to the system were enacted during the 2019 Regular Session of the Louisiana Legislature:

Act 89 repeals R.S. 11:2259(B) in its entirety. R.S. 11:2259(B) previously allowed members who retired while single to select an option for a spouse if married after their retirement.

Act 91 changes the actuarial funding method for use in performing annual actuarial valuation s for the Firefighters' Retirement System from the entry age normal method to the frozen initial liability method

beginning with the fiscal 2019 valuation. It further stipulates that the outstanding balance of the unfunded accrued liability, except unamortized merger bases, will be frozen, combined and reamortized over a fifteen year period with payments decreasing by one percent per year. All future actuarial gains and losses, contributions gains and losses, gains and losses arising from changes in benefits, and gains and losses arising from changes in assumptions, shall be included in the calculation of the normal cost.

Act 254 set the National Fire Protection Association code 1582, Standard on Comprehensive Occupational Medical Program for Fire Departments as the governing standard of physical evaluations required for membership in the system. No employee may be enrolled as a member of the system until the system receives a written statement from the employer certifying successful completion of a physical examination that meets or exceeds this standard.

Act 288 states that any employee who files an affidavit electing not to be a member is not only not eligible to rejoin the system while employed by the same employer but also not eligible to rejoin the system if employed by any other employer whose employees are covered by the federal Social Security program. Also, upon returning to work with any employer whose employees are not covered under the federal Social Security System no such employee may purchase credit for any period where he opted out of membership.

Additionally, the act authorizes the Department of Public Safety and Corrections to provide the name, address, and social security number of each recipient of state supplemental pay to the Retirement System and the Municipal Police Employees' Retirement System.

ASSET EXPERIENCE

The actuarial and market rates of return for the past ten years are given below. These investment rates of return were determined by assuming a uniform distribution of income and expense throughout the fiscal year.

	Market Value	Actuarial Value
2010	12.2%	6.1%
2011	17.4%	4.5%
2012	-4.1% †	-0.2% †
2013	10.5%	2.5%
2014	11.4%	8.8%
2015	-0.2%	6.7%
2016	-2.3%	3.1%
2017	13.6%	5.7%
2018	6.5%	5.6%
2019	4.4%	4.5%

† Based upon asset values which include an unaudited "best estimate" of the value of a receivable related to the FIA Leveraged Fund.

Geometric Average Market Rates of Return

5 year average	(Fiscal 2015 – 2019)	4.3%
10 year average	(Fiscal 2010 – 2019)	6.7%
15 year average	(Fiscal 2005 – 2019)	5.0%
20 year average	(Fiscal 2000 – 2019)	4.4%
25 year average	(Fiscal 1995 – 2019)	5.8%

The market rate of return gives a measure of investment return on a total return basis and includes realized and unrealized capital gains and losses as well as interest income. Asset and income values for merger notes were excluded from calculations in order to provide a measurement of the return on the portion of the portfolio under management. This rate of return gives an indication of performance for an actively managed portfolio where securities are bought and sold with the objective of producing the highest total rate of return. During 2019 the fund earned $23,804,887 of dividends, interest and other recurring income. During the same period, the Fund had net realized and unrealized capital gains on investments and non-recurring income of $60,448,821. This income was offset by investment expenses of $9,993,975.

The actuarial rate of return is presented for comparison to the assumed long-term rate of return of 7.3% used for the prior valuation (7.15% beginning with July 1, 2019). This rate is calculated based on the actuarial value of assets and the market value income adjusted for actuarial smoothing as given in Exhibit VI. Investment income used to calculate this yield is based upon a smoothing of investment income above or below the valuation interest rate over a five year period subject to constraints. The difference between rates of return on an actuarial and market value basis results from the smoothing utilized. Yields in excess of the applicable interest assumption will reduce future costs; yields below the applicable assumption will increase future costs. For Fiscal 2019, the system experienced net actuarial investment earnings of $48,181,781 below the actuarial assumed earnings rate in effect for Fiscal 2019 of 7.30% which produced an actuarial loss and increased the interest-adjusted amortization payments on the system's UAL by $5,204,172 or 2.11% of projected payroll.

DEMOGRAPHICS AND LIABILITY EXPERIENCE

A reconciliation of the census for the system is given in Exhibit X. The average active contributing member is 38 years old with 11.63 years of service credit and an annual salary of $54,074. The system's active contributing membership experienced an increase of 22 members during Fiscal 2019. The number of DROP participants increased by 16 during Fiscal 2019. Over the last five years active membership has increased by 348 members. A review of the active census by age indicates that over the last ten years the population in the under thirty age group and the forty-one to fifty age group has decreased while the proportion of active members over fifty increased. Over the same ten-year period the system's active census by service remained relatively stable, although members with less than five years of service did decrease.

The average service retiree is 66 years old with a monthly benefit of $3,821. The number of retirees and beneficiaries receiving benefits from the system increased by 80 during the fiscal year. Over the last five years, the number has increased by 350; during the same period, the annual benefits in payment increased by $24,142,635.

The changes in the makeup of the population and changes in members' salaries increased the interest adjusted employer normal cost (on an entry age normal basis) over the last year by $735,708; the employer normal cost percentage increased by 0.11% of payroll. Plan liability experience for Fiscal 2019 was favorable. Salary increase rates at most durations were less than projected; DROP entries were above projections while most other decrements were near projected levels. Net plan liability experience gains totaled $13,797,929. These gains decreased the interest-adjusted amortization payments on the system's unfunded accrued liability by $1,490,331, which corresponds to payments of 0.61% of Fiscal 2020 payroll.

FUNDING ANALYSIS AND RECOMMENDATIONS

Actuarial funding of a retirement system is a process whereby funds are accumulated over the working lifetimes of employees in such a manner as to have sufficient assets available at retirement to pay for the lifetime benefits accrued by each member of the system. The required contributions are determined by an actuarial valuation based on rates of mortality, termination, disability, DROP entry and retirement, as well as investment return and other statistical measures specific to the particular group. Each year a determination is made of two cost components, and the actuarially required contributions are based on the sum of these two components plus administrative expenses. These two components are the normal cost and the amortization payments on the unfunded actuarial accrued liability. The normal cost refers to the annual cost for active members allocated to each year by the particular cost method utilized. The term unfunded accrued liability (UAL) refers to the excess of the present value of plan benefits over the sum of current assets and future normal costs. Each year the UAL grows with interest and is reduced by payments. In addition it may be increased or diminished by plan experience, changes in assumptions, or changes in benefits including COLA's. Contributions in excess of or less than the actuarially required amount can also decrease or increase the UAL balance. New entrants to the system can also increase or lower costs as a percent of payroll depending upon their demographic distribution. Finally, payroll growth affects plan costs since direct employer payments on the system's unfunded liability are on a fixed schedule with payments decreasing at one percent each year. If payroll increases or decreases by less than one percent, these costs are reduced as a percentage of payroll.

In order to establish the actuarially required contribution in any given year, it is necessary to define the assumptions, funding method, and method of amortizing the UAL. Thus, the determination of what contribution is actuarially required depends upon the funding method and amortization schedules employed. Regardless of the method selected, the ultimate cost of providing benefits is dependent upon the benefits, expenses, and investment earnings. Only to the extent that some methods accumulate assets more rapidly and thus produce greater investment earnings does the funding method affect the ultimate cost.

An explanation of the change in costs related to asset and liability gains and losses as well as changes in demographics and assumptions is given in prior sections of the report. In addition to these components, variances in contribution levels and payroll also affect costs. For Fiscal 2019 contributions totaled $4,708,679 less than required; the interest-adjusted amortization payment on the contribution shortfall for Fiscal 2020 is $508,590, or 0.21% of Fiscal 2020 projected payroll. In addition, for Fiscal 2020 the net effect of the change in payroll on amortization costs was to reduce such costs by 0.32% of projected payroll. Also, the elimination of gain and loss bases from 2004, after completion of all scheduled payments, results in a decrease in costs by 0.17%.

A reconciliation of the change in costs is given below. Values listed in dollars are interest adjusted for payment throughout the fiscal year. Percentages are based on the projected payroll for Fiscal 2020 except for those items labeled Fiscal 2019.

		Dollars	Percentage of Payroll
Employer Normal Cost (EAN) for Fiscal 2019	$	34,904,077	14.37%
Cost of Demographic and Salary Changes	$	735,708	0.11%
Change due to Assumption Changes	$	110,648	0.04%
Employer Normal Cost (EAN) for Fiscal 2020	$	35,750,433	14.52%

Change due to Change in Funding Method	$	(41,910)	(0.01%)
Employer Normal Cost (FIL) for Fiscal 2020	$	35,708,523	14.51%
UAL Amortization Payments for Fiscal 2019	$	58,710,108	24.17%
Change due to elimination of Amortization	$	(403,159)	(0.17%)
Change due to change in payroll		N/A	(0.32%)
Additional Amortization Expenses for Fiscal 2020:			
Asset Experience Loss (Gain)	$	5,204,172	2.11%
Liability Experience Loss (Gain)	$	(1,489,289)	(0.61%)
Liability Assumption Loss (Gain)	$	3,104,177	1.26%
Contribution Loss (Gain)	$	508,590	0.21%
Change due to Interest Rate Change	$	(516,398)	(0.21%)
Change in Amortization Scheduling	$	3,488,019	1.42%
Total Amortization Expense under FIL for Fiscal 2020	$	68,606,220	27.86%
Insurance Premium Taxes	$	(28,017,672)	(11.38%)
Estimated Administrative Cost for Fiscal 2020	$	1,937,980	0.79%
Total Employer Normal Cost & Amortization Payments	$	78,235,051	31.78%

The derivation of the actuarially required contribution for the current fiscal year is given in Exhibit I. The employer normal cost for Fiscal 2020, interest adjusted for mid-year payment is $35,708,523. This value includes the effect of changes in the funding method and assumptions. The interest adjusted amortization payments on the system's unfunded actuarial accrued liability totaled $68,606,220. This value includes the effect of the change in amortization schedule as well as the reduction in the valuation interest rate. The total actuarially required contribution is determined by summing these two values together with estimated administrative expenses. As given in line 15 of Exhibit I the total actuarially required contribution for Fiscal 2020 is $106,252,723. We estimate insurance premium taxes of $28,017,672, or 11.38% of payroll, will be paid to the system in Fiscal 2020. This level of Insurance Premium Taxes represents a 0.34% increase over the prior year as a percentage of payroll. Hence, the total actuarially required net direct employer contribution for Fiscal 2020 amounts to $78,235,051 or 31.78% of payroll.

Since the actual employer contribution rate for Fiscal 2020 is 27.75% of payroll, there will be a contribution shortfall of 4.03% of payroll. This shortfall will increase the actuarially required contribution recommended for Fiscal 2021. In order to determine a minimum recommended net direct employer contribution rate for Fiscal 2021, the Employers' Minimum Net Direct Actuarially Required Contribution for 2020 was adjusted for the impact of the estimated contribution shortfall. The resulting Minimum Recommended Net Direct Employer Contribution Rate for Fiscal 2021 is 32.25%.

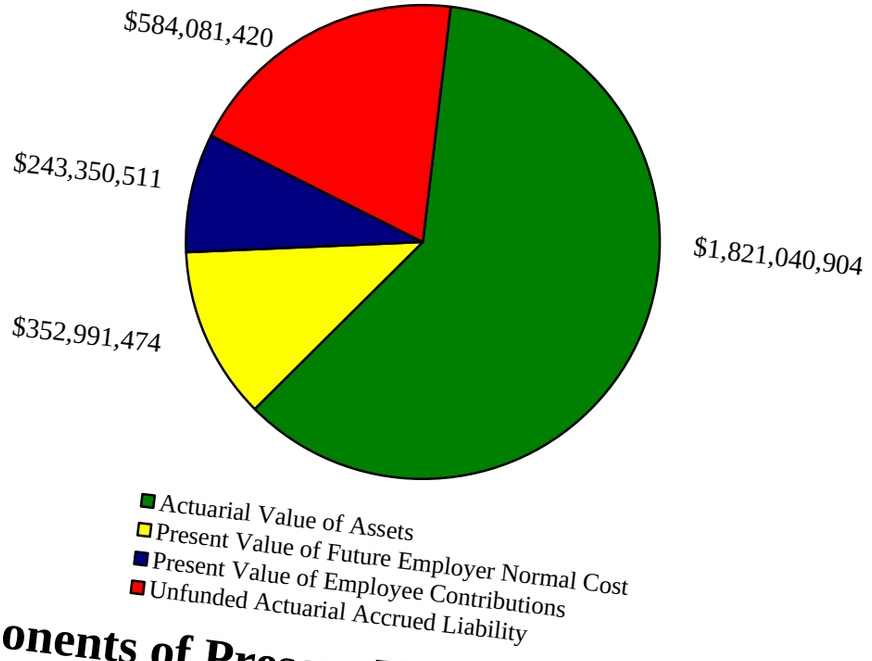
COST OF LIVING INCREASES

During Fiscal 2019, the actual cost of living (as measured by the US Department of Labor CPI-U) increased by 1.6%. Cost of living provisions for the system are detailed in R.S. 11:2260A(7) and R.S. 11:246. The former statute allows the Board to use interest earnings in excess of the normal requirements to grant annual cost of living increases of up to 3% of each retiree's current benefit. R.S. 11:246 provides cost of living increases to retirees and beneficiaries over the age of 65 equal to 2% of the benefit in payment on October 1, 1977, or the date the benefit was originally received if retirement commenced after that date. In addition, R.S. 11:241 provides for cost of living benefits payable based on a formula equal to up to $1 times the total of the number of years of credited service accrued at retirement or at death of the member or retiree plus the number of years since retirement or since death of the member or retiree to the system's fiscal year end preceding the payment of the benefit increase. The provisions of R.S. 11:241 of this subpart do not repeal provisions relative to cost of living adjustments contained within the individual laws governing systems; however, they are to be controlling in cases of conflict.

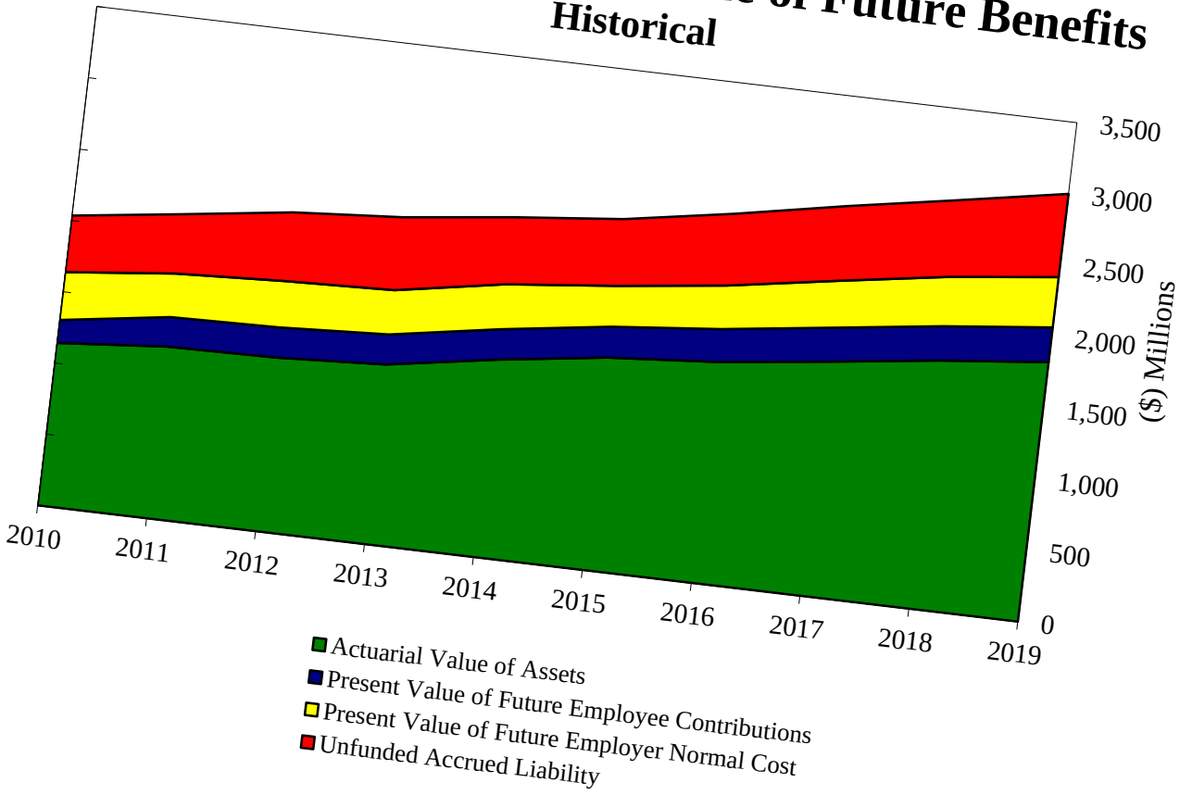
R.S. 11:243 sets forth the funding criteria necessary in order to grant cost of living adjustments to regular retirees and beneficiaries (who are neither the surviving spouse nor children of the retiree.) The criteria for the fund to qualify as eligible to grant any such increase is as follows: a funded ratio of at least 70% if the system has not granted a benefit increase to retirees, survivors, or beneficiaries in any of the three most recent fiscal years; a funded ratio of at least 80% if the system has not granted such an increase in any of the two most recent fiscal years; or a funded ratio of at least 90% if the system has not granted such an increase in the most recent fiscal year. The funded ratio at any fiscal year end is the ratio of the actuarial value of assets to the actuarial accrued liability under the funding method prescribed by the legislative auditor (currently the Projected Unit Credit Method for this system).

With a funded ratio (as measured by the Actuarial Value of Assets divided by the Pension Benefit Obligation) of 77.96% and since the system granted a cost of living increase on January 1, 2015 which is not within the three most recent fiscal years, we have determined that for Fiscal 2019 the plan does meet the criteria set forth in R. S. 11:243 for granting a cost of living increase. However, the system failed to earn the 7.30% assumed rate of return on an actuarial basis and therefore has no "excess interest" for the fiscal year. Therefore, the system does not qualify for payment of a cost of living increase.

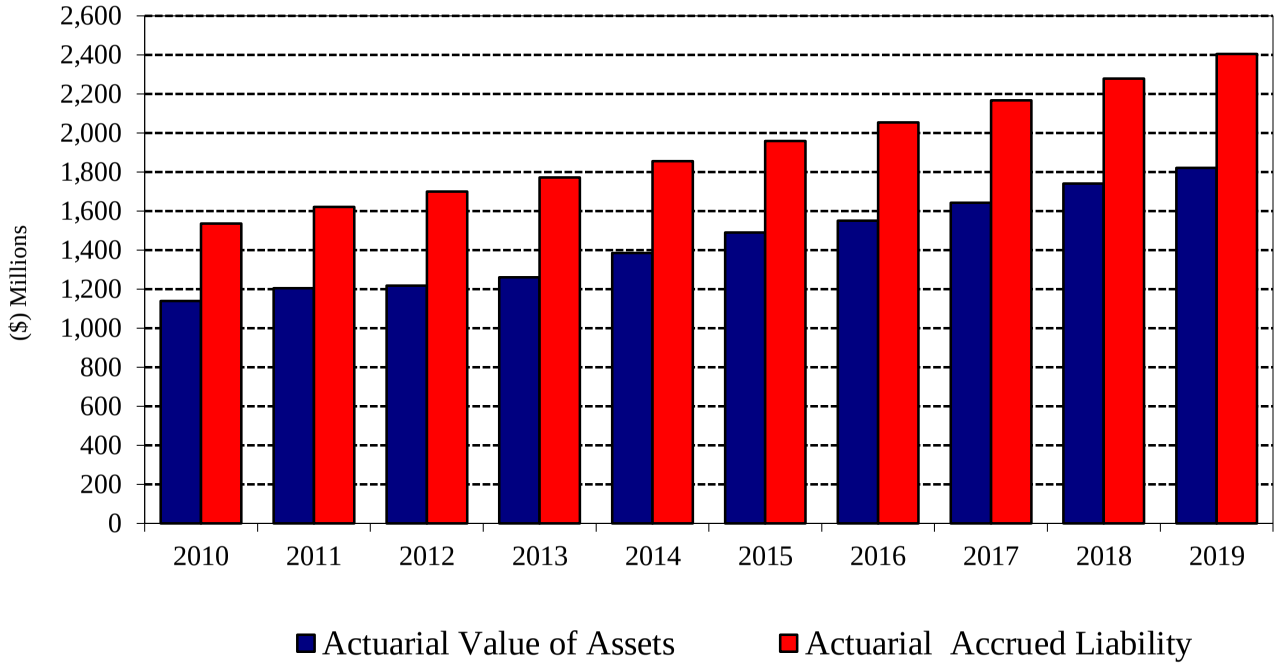
Components of Present Value of Future Benefits
June 30, 2019



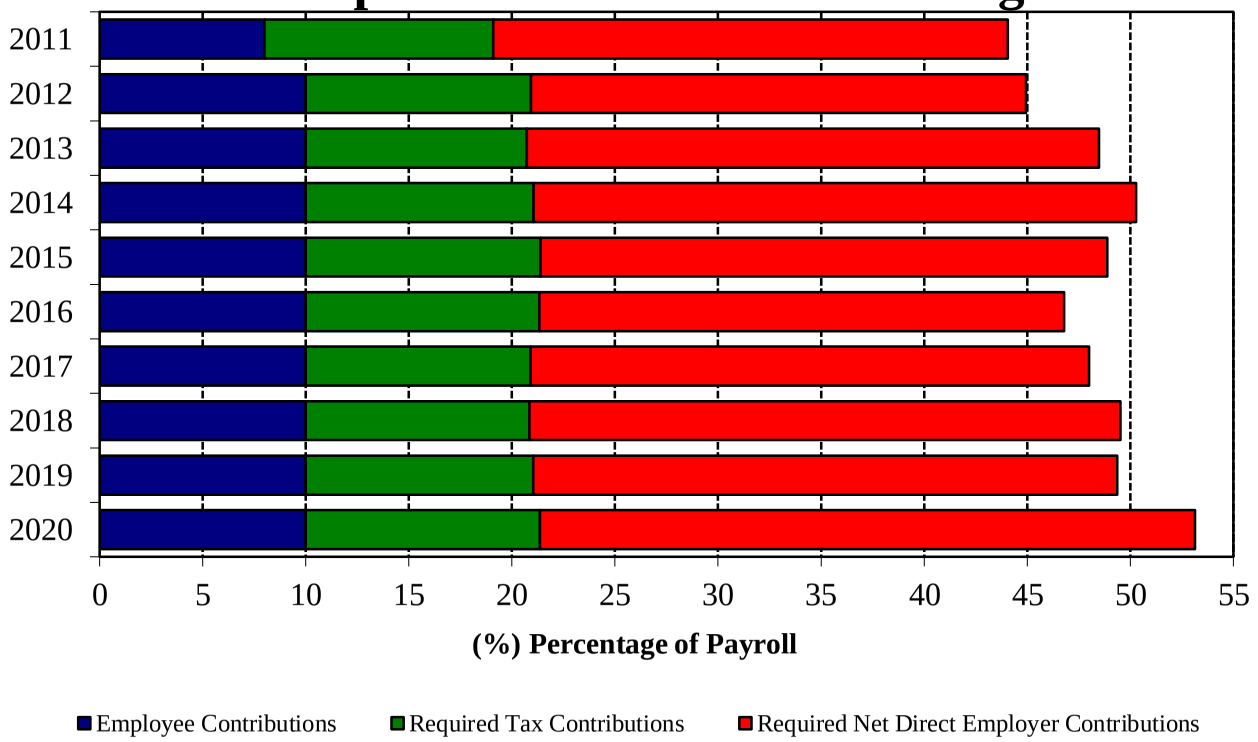
Components of Present Value of Future Benefits
Historical



Actuarial Value of Assets vs. Actuarial Accrued Liability

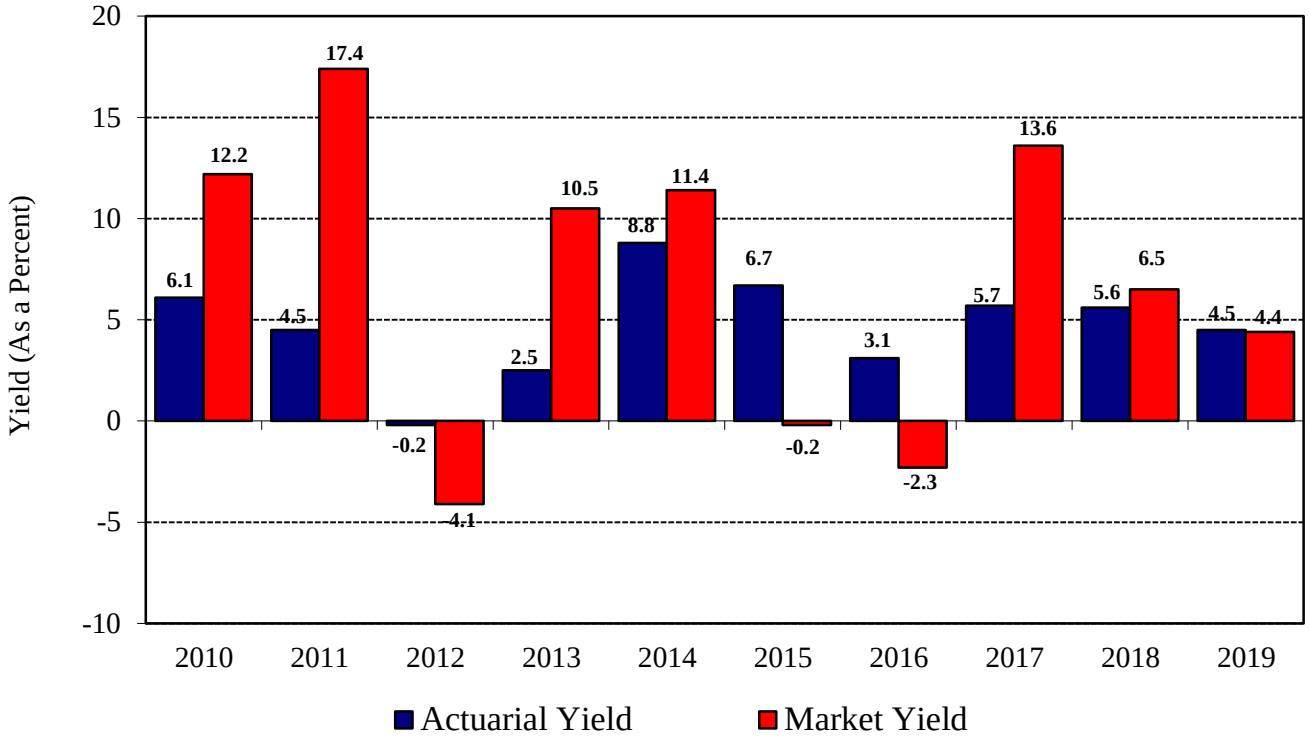


Components of Actuarial Funding

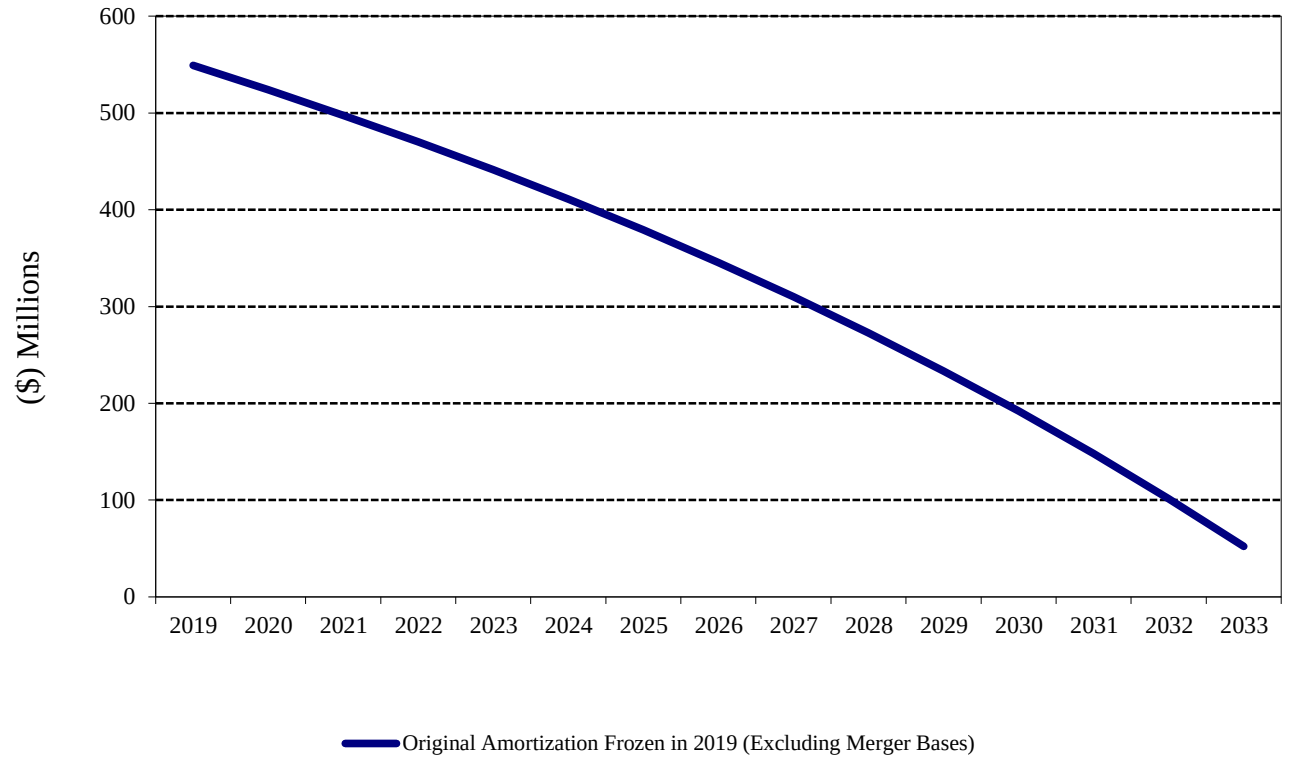


(2012 and later employee contribution level is based on members with earnings above the poverty level)

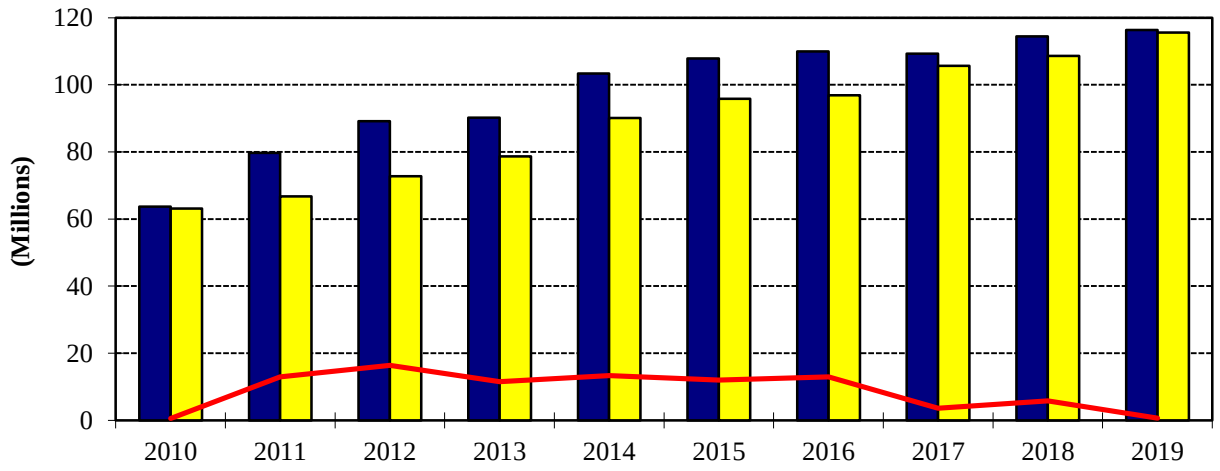
Historical Asset Yields



Frozen Unfunded Actuarial Accrued Liability



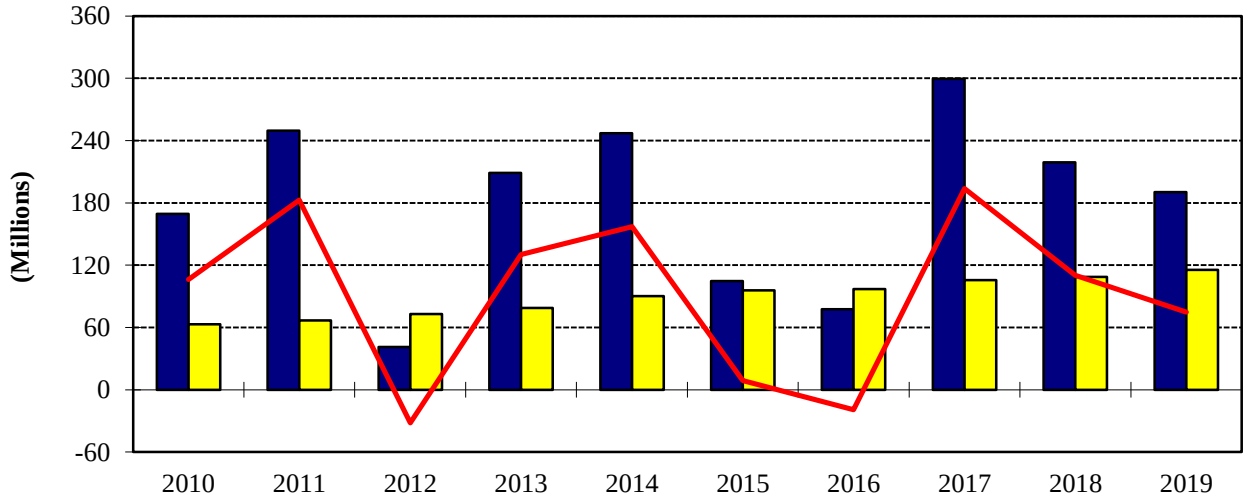
Net Non-Investment Income



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Non-Investment Income ($Mil)	63.7	79.7	89.2	90.2	103.4	107.8	109.9	109.3	114.4	116.3
Benefits and Expenses ($Mil)	63.1	66.7	72.8	78.7	90.1	95.8	96.9	105.7	108.6	115.6
Net Non-Investment Income ($Mil)	0.6	13.0	16.4	11.5	13.3	12.0	13.0	3.6	5.8	0.7

Total Income vs. Expenses

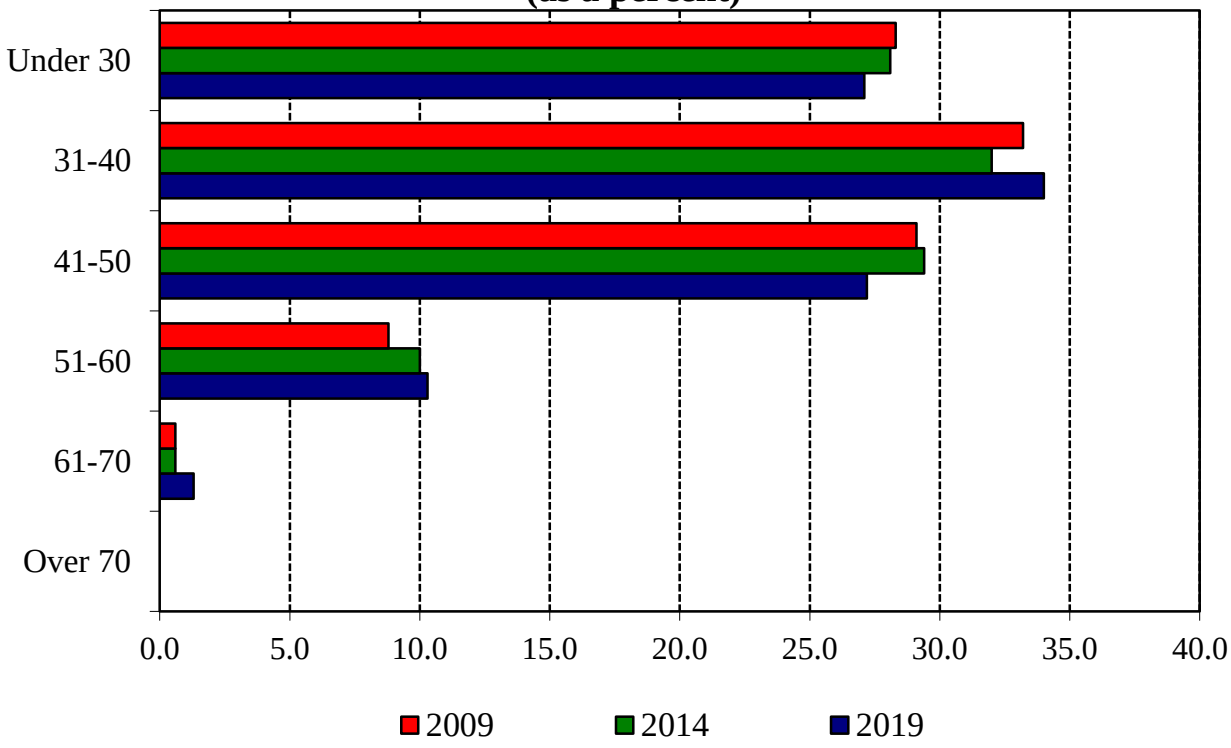
(Based on Market Value of Assets)



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Total Income ($Mil)	169.3	249.4	41.2	209.0	247.2	104.6	77.7	299.5	218.9	190.5
Benefits and Expenses ($Mil)	63.1	66.7	72.8	78.7	90.1	95.8	96.9	105.7	108.6	115.6
Net Change in MVA ($Mil)	106.2	182.7	-31.6	130.3	157.1	8.8	-19.2	193.8	110.3	74.9

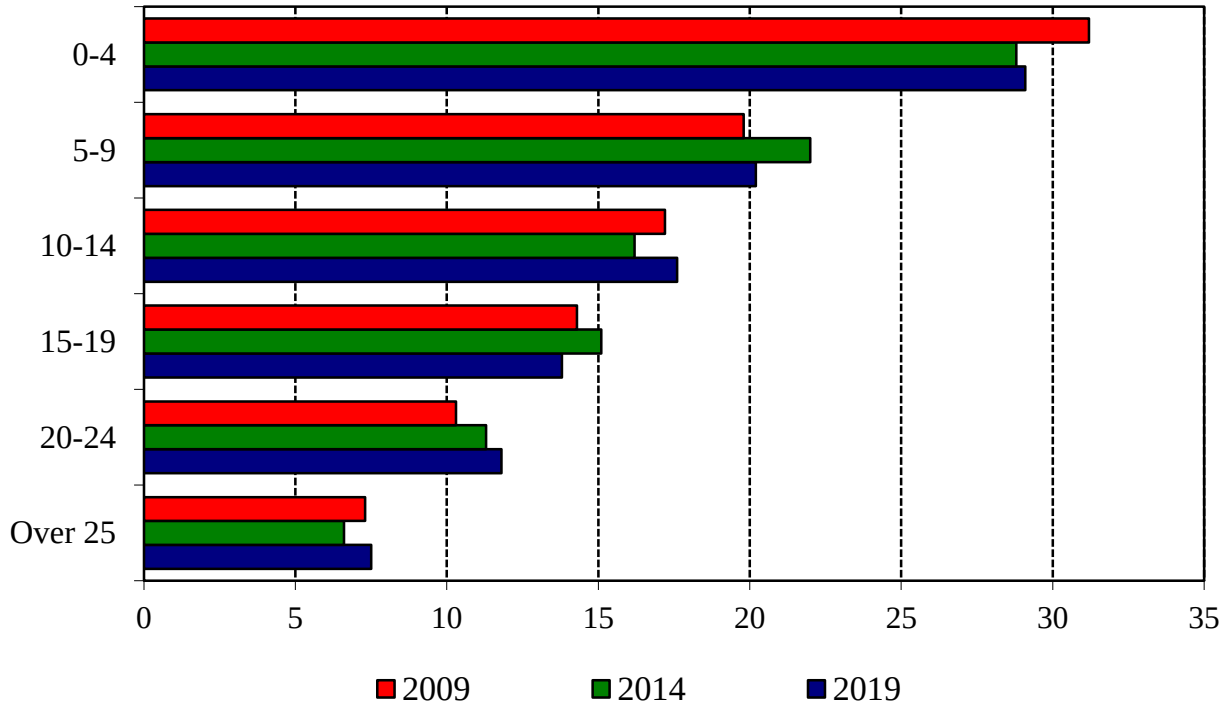
Active – Census by Age

(as a percent)



Active – Census by Service

(as a percent)



EXHIBITS

EXHIBIT I
ANALYSIS OF ACTUARIALLY REQUIRED CONTRIBUTIONS

1.	Present Value of Future Benefits	$	3,001,464,309
2.	Funding Deposit Account Credit Balance	$	0
3.	Unfunded Actuarial Accrued Liability	$	584,081,420
4.	Actuarial Value of Assets	$	1,821,040,904
5.	Present Value of Future Employee Contributions	$	243,350,511
6.	Present Value of Future Employer Normal Costs (1 + 2 – 3 – 4 – 5)	$	352,991,474
7.	Present Value of Future Salaries	$	2,433,505,116
8.	Employer Normal Cost Accrual Rate (6 ÷ 7)		14.505475%
9.	Projected Fiscal 2020 Salary for Current Membership	$	237,817,520
10.	Employer Normal Cost as of July 1, 2019 (8 × 9)	$	34,496,561
11.	Employer Normal Cost Interest Adjusted for Mid-year Payment	$	35,708,523
12.	Amortization Payment on Remaining Frozen Unfunded Accrued Liability Interest Adjusted for Mid-year Payment	$	68,606,220
13.	TOTAL Employer Normal Cost and Amortization Payment (11 + 12)	$	104,314,743
14.	Estimated Administrative Cost for Fiscal 2020	$	1,937,980
15.	GROSS Employer Actuarially Required Contribution for Fiscal 2020 (13 + 14)	$	106,252,723
16.	Projected Insurance Premium Taxes for Fiscal 2020	$	28,017,672
17.	Net Direct Employer Actuarially Required Contribution for Fiscal 2020 (15 – 16)	$	78,235,051
18.	Projected Payroll for Fiscal 2020	$	246,180,693
19.	Employers' Minimum Net Direct Actuarially Required Contribution as a % of Projected Payroll for Fiscal 2020 (17 ÷ 18)		31.78%
20.	Board Adopted Employer Contribution Rate for Fiscal 2020		27.75%
21.	Contribution Shortfall (Excess) as a Percentage of Payroll (19 – 20)		4.03%
22.	Increase (Reduction) to Following Year Payment for Contribution Shortfall (Excess)		0.39%
23.	Minimum Recommended Net Direct Employer Contribution Rate for Fiscal 2021 (19 + 22, Rounded to nearest 0.25%)		32.25%

* The above rates are for members with earnings greater than the Department of HHS poverty guidelines. For members with earnings below the poverty guidelines, employer rates will be 2.0% higher and employee rates will be 2.0% lower.

EXHIBIT II
PRESENT VALUE OF FUTURE BENEFITS

PRESENT VALUE OF FUTURE BENEFITS FOR ACTIVE MEMBERS:

Retirement Benefits	$ 1,736,930,858	
Survivor Benefits	27,862,291	
Disability Benefits	20,398,684	
Vested Termination Benefits	33,423,196	
Refunds of Contributions	14,556,390	
TOTAL Present Value of Future Benefits for Active Members		$ 1,833,171,419

PRESENT VALUE OF FUTURE BENEFITS FOR TERMINATED MEMBERS:

Terminated Vested Members Due Benefits at Retirement	$ 19,472,505	
Terminated Members with Reciprocals Due Benefits at Retirement	0	
Terminated Members Due a Refund	3,554,200	
TOTAL Present Value of Future Benefits for Terminated Members		$ 23,026,705

PRESENT VALUE OF FUTURE BENEFITS FOR RETIREES:

Regular Retirees			
Maximum	$ 242,752,355		
Option 1	90,597,145		
Option 2	440,732,266		
Option 3	162,964,304		
Option 4	3,984,447		
Option 5	0		
TOTAL Regular Retirees		$ 941,030,517	
Disability Retirees		29,867,185	
Survivors & Widows		69,819,021	
DROP Annuities		702,063	
DROP Account Balances Payable to Retirees		100,621,927	
IBO Retirees' Account Balance		3,225,472	
TOTAL Present Value of Future Benefits for Retirees & Survivors			$ 1,145,266,185
TOTAL PRESENT VALUE OF FUTURE BENEFITS			$ 3,001,464,309

EXHIBIT III – SCHEDULE A
MARKET VALUE OF ASSETS

CURRENT ASSETS:			
Cash in Banks	$	10,478,895	
Contributions and Taxes Receivable		7,879,490	
Accrued Interest and Dividends		8,902,096	
Investments Receivable		592,368	
Prepaid Expenses		22,762	
TOTAL CURRENT ASSETS			$ 27,875,611
Property Plant & Equipment			$ 642,415
INVESTMENTS:			
Cash Equivalents	$	45,086,310	
Equities		833,285,347	
Fixed Income		517,074,790	
Real Estate		121,217,001	
Alternative Investments		66,160,569	
Tactical Allocation		168,013,876	
Other Investments		(25,969)	
TOTAL INVESTMENTS			$ 1,750,811,924
MERGER NOTES			$ 2,480,853
TOTAL ASSETS			$ 1,781,810,803
CURRENT LIABILITIES:			
Accounts Payable	$	1,266,641	
Investments Payable		955,257	
Other Post-Employment Benefits		566,955	
TOTAL CURRENT LIABILITIES			$ 2,788,853
DEFERRED INFLOWS OF RESOURCES			$ 90,636
TOTAL LIABILITIES			$ 2,879,489
MARKET VALUE OF ASSETS			$ 1,778,931,314

EXHIBIT III – SCHEDULE B
ACTUARIAL VALUE OF ASSETS

Excess (Shortfall) of invested income
for current and previous 4 years:

Fiscal year 2019	$ (50,158,174)
Fiscal year 2018	(13,637,997)
Fiscal year 2017	85,071,538
Fiscal year 2016	(139,144,339)
Fiscal year 2015	(109,387,912)
Total for five years	$ (227,256,884)

Deferral of excess (shortfall) of invested income:

Fiscal year 2019 (80%)	$ (40,126,539)
Fiscal year 2018 (60%)	(8,182,798)
Fiscal year 2017 (40%)	34,028,615
Fiscal year 2016 (20%)	(27,828,868)
Fiscal year 2015 (0%)	0
Total deferred for year	$ (42,109,590)

Market value of plan net assets, end of year	$ 1,778,931,314
Preliminary actuarial value of plan assets, end of year	$ 1,821,040,904

Actuarial value of assets corridor

85% of market value, end of year	$ 1,512,091,617
115% of market value, end of year	$ 2,045,771,011
Final actuarial value of plan net assets, end of year	$ 1,821,040,904

EXHIBIT IV
PRESENT VALUE OF FUTURE CONTRIBUTIONS

Employee Contributions to the Annuity Savings Fund		$ 243,350,511
Employer Normal Contributions to the Pension Accumulation Fund		352,991,474
Employer Amortization Payments to the Pension Accumulation Fund		584,081,420
TOTAL PRESENT VALUE OF FUTURE CONTRIBUTIONS		$ 1,180,423,405

EXHIBIT V - SCHEDULE A
ACTUARIAL ACCRUED LIABILITIES

LIABILITY FOR ACTIVE MEMBERS		
Accrued Liability for Retirement Benefits	$ 1,214,016,802	
Accrued Liability for Survivor Benefits	11,206,599	
Accrued Liability for Disability Benefits	5,747,873	
Accrued Liability for Vested Termination Benefits	14,952,625	
Accrued Liability for Refunds of Contributions	(9,094,465)	
TOTAL Actuarial Accrued Liability for Active Members		$ 1,236,829,434
LIABILITY FOR TERMINATED MEMBERS		$ 23,026,705
LIABILITY FOR RETIREES AND SURVIVORS		$ 1,145,266,185
TOTAL ACTUARIAL ACCRUED LIABILITY (AAL)		$ 2,405,122,324
ACTUARIAL VALUE OF ASSETS		$ 1,821,040,904
UNFUNDED ACTUARIAL ACCRUED LIABILITY		$ 584,081,420
Ratio of Net Actuarial Value of Assets to Entry Age Normal AAL		75.72%

EXHIBIT V - SCHEDULE B
CHANGE IN UNFUNDED ACTUARIAL ACCRUED LIABILITY

PRIOR YEAR UNFUNDED ACCRUED LIABILITY		$ 537,805,006
Interest on Unfunded Accrued Liability	$ 39,259,765	
Investment Experience Loss	48,181,781	
Liability Assumption Loss	28,739,403	
Contribution Shortfall with Accrued Interest	4,708,679	
TOTAL Additions to UAL		$ 120,889,628
Liability Experience Gain	13,797,929	
Interest Adjusted Amortization Payments	60,815,285	
TOTAL Reductions to UAL		$ 74,613,214
NET Change in Unfunded Accrued Liability		$ 46,276,414
CURRENT YEAR UNFUNDED ACCRUED LIABILITY		$ 584,081,420

EXHIBIT V - SCHEDULE C
AMORTIZATION OF UNFUNDED ACTUARIAL ACCRUED LIABILITY - June 30, 2019

FISCAL YEAR	DESCRIPTION	AMORT. PERIOD	INITIAL BALANCE	YEARS REMAINING	REMAINING BALANCE	AMORT. PAYMENTS (Mid-Year)
1993	Merger Loss	30	$13,485,002	4	$3,767,482	$1,078,157
1995	Merger Loss	30	41,779,611	6	16,403,693	3,340,033
1996	Merger Loss	30	1,772,399	7	786,286	141,684
1997	Merger Loss	30	890,324	8	437,342	71,166
1998	Merger Loss	30	1,602,435	9	858,294	128,079
1999	Merger Loss	30	14,104,876	10	8,139,151	1,127,275
2001	Merger Loss	30	3,117,590	12	2,031,898	249,117
2007	Merger Loss	30	1,065,812	18	875,200	84,965
2008	Merger Loss	30	1,556,324	19	1,311,347	123,953
2011	Merger Loss	30	329,132	22	295,674	26,145
			Total Outstanding Merger Bases		$34,906,367	$6,370,574
2002	Cumulative Non-Merger Bases	27	175,578,584	10	104,886,513	
2004	Contribution Loss	15	2,129,874	0	0	
2004	Experience Loss	15	1,570,785	0	0	
2005	Experience Gain	15	(24,922,321)	1	(2,622,895)	
2005	Assumption Gain	15	(57,207,831)	1	(6,020,715)	
2005	Contribution Gain	15	(2,457,193)	1	(258,602)	
2006	Experience Gain	15	(30,043,731)	2	(6,103,381)	
2006	Benefits/COLA Loss	15	12,495,729	2	2,538,507	
2006	Assumption Loss	15	7,880,410	2	1,600,904	
2006	Contribution Gain	15	(3,044,474)	2	(618,485)	
2007	Contribution Gain	15	(3,684,696)	3	(1,084,158)	
2007	Experience Gain	15	(19,348,466)	3	(5,692,953)	
2007	Benefits/COLA Loss	15	13,421,495	3	3,949,043	
2008	Assumption Gain	15	(138,425)	4	(52,459)	
2008	Contribution Gain	15	(4,399,499)	4	(1,667,265)	
2008	Experience Loss	15	11,244,458	4	4,261,280	
2008	Benefits/COLA Loss	15	15,006,752	4	5,687,066	
2009	Asset Assumption Gain	15	(121,695,690)	5	(55,711,792)	
2009	Asset Experience Loss	20	261,874,151	10	176,139,439	
2009	COLA Loss	20	15,784,880	10	10,617,084	
2009	Experience Gain	20	(3,921,422)	10	(2,637,591)	
2009	Contribution Loss	20	993,536	10	668,263	
2010	Liability Assumption Loss	15	37,843,942	6	20,100,081	
2010	Asset Experience Loss	19	14,930,089	10	10,279,518	
2010	Experience Loss	19	985,441	10	678,485	
2010	Contribution Loss	19	11,264,571	10	7,755,773	
2011	Asset Experience Loss	18	34,204,316	10	24,164,052	
2011	Experience Gain	18	(13,197,519)	10	(9,323,547)	
2011	Contribution Loss	18	6,777,563	10	4,788,091	
2012	Asset Experience Loss	17	93,583,915	10	68,020,016	
2012	Experience Gain	17	(21,072,289)	10	(15,316,066)	

FISCAL YEAR	DESCRIPTION	AMORT. PERIOD	INITIAL BALANCE	YEARS REMAINING	REMAINING BALANCE	AMORT. PAYMENTS (Mid-Year)
2012	Contribution Loss	17	2,867,982	10	2,084,548	
2013	Asset Experience Loss	16	61,647,815	10	46,241,238	
2013	Experience Gain	16	(30,226,604)	10	(22,672,589)	
2013	Contribution Loss	16	9,431,584	10	7,074,511	
2013	Assumption Loss	15	1,290,257	9	931,398	
2014	Asset Experience Gain	15	(16,528,266)	10	(12,839,196)	
2014	Experience Gain	15	(12,708,035)	10	(9,871,630)	
2014	Contribution Loss	15	3,117,549	10	2,421,720	
2014	Liability Assumption Gain	15	(318,965)	10	(247,771)	
2015	Asset Experience Loss	15	11,058,278	11	9,155,218	
2015	Experience Gain	15	(18,187,590)	11	(15,057,622)	
2015	Contribution Gain	15	(5,158,272)	11	(4,270,565)	
2015	Liability Assumption Loss	15	7,891,805	11	6,533,675	
2015	COLA Loss	15	17,767,886	11	14,710,143	
2016	Asset Experience Loss	15	65,389,778	12	57,245,434	
2016	Experience Gain	15	(6,578,348)	12	(5,759,010)	
2016	Contribution Gain	15	(6,794,080)	12	(5,947,872)	
2017	Liability Assumption Loss	15	22,708,091	13	20,884,168	
2017	Asset Experience Loss	15	27,265,283	13	25,075,324	
2017	Experience Gain	15	(13,331,207)	13	(12,260,438)	
2017	Contribution Loss	15	3,496,362	13	3,215,533	
2018	Asset Experience Loss	15	29,194,603	14	28,059,395	
2018	Experience Gain	15	(22,251,659)	14	(21,386,422)	
2018	Contribution Loss	15	6,228,012	14	5,985,841	
2018	Liability Assumption Loss	15	23,944,920	14	23,013,841	
2019	Asset Experience Loss (Gain)	15	48,181,781	15	48,181,781	
2019	Experience Loss (Gain)	15	(13,797,929)	15	(13,797,929)	
2019	Contribution Loss (Gain)	15	4,708,679	15	4,708,679	
2019	Liability Assumption Loss (Gain)	15	28,739,403	15	28,739,403	
			Total Outstanding Non-Merger Bases		$ 549,175,053	$ 62,235,646

TOTAL Frozen Unfunded Actuarial Accrued Liability as of $ 584,081,420*

TOTAL Fiscal 2020 Amortization Payments Adjusted to Mid-Year $ 68,606,220

* Does not equal sum of remaining balances due to rounding.

EXHIBIT VI
ANALYSIS OF CHANGE IN ASSETS

Actuarial Value of Assets (June 30, 2018)		$ 1,741,451,961
INCOME:		
Member Contributions	$ 24,230,606	
Employer Contributions	64,205,763	
Irregular Contributions	625,513	
Insurance Premium Taxes	26,807,631	
Other Income	380,811	
Total Contributions		$ 116,250,324
Net Appreciation of Investments	$ 55,066,870	
Interest & Dividends	23,804,887	
Legal Settlement	5,381,951	
Investment Expense	(9,993,975)	
Net Investment Income		$ 74,259,733
TOTAL Income		$ 190,510,057
EXPENSES:		
Retirement Benefits	$ 111,352,185	
Refunds of Contributions	2,216,744	
Transfers to Other Systems	173,522	
Administrative Expenses	1,885,460	
TOTAL Expenses		$ 115,627,911
Net Market Value Income for Fiscal 2019 (Income - Expenses)		$ 74,882,146
Unadjusted Assets as of June 30, 2019 (Assets Previous Year + Net Income)		$ 1,816,334,107
Adjustment for Actuarial Smoothing		$ 4,706,797
Actuarial Value of Assets: (June 30, 2019)		$ 1,821,040,904

EXHIBIT VII
PENSION BENEFIT OBLIGATION

Present Value of Credited Projected Benefits Payable to Current Employees.....	$ 1,167,469,886
Present Value of Benefits Payable to Terminated Employees	23,026,705
Present Value of Benefits Payable to Current Retirees and Beneficiaries	1,145,266,185
TOTAL PENSION BENEFIT OBLIGATION	$ 2,335,762,776
NET ACTUARIAL VALUE OF ASSETS	$ 1,821,040,904
Ratio of Net Actuarial Value of Assets to Pension Benefit Obligation.....	77.96%

EXHIBIT VIII
CENSUS DATA

	Active	Terminated with Funds on Deposit	DROP	Retired	Total
Number of members as of June 30, 2018	4,424	732	192	2,327	7,675
Additions to Census					
Initial membership	298	27			325
Omitted in error last year				1	1
Death of another member				17	17
Adjustment for multiple records					
Change in Status during Year					
Actives terminating service	(87)	87			
Actives who retired	(54)			54	
Actives entering DROP	(89)		89		
Term. members rehired	26	(26)			
Term. members who retire		(1)		1	
Retirees who are rehired	1			(1)	
Refunded who are rehired	3				3
DROP participants retiring			(61)	61	
DROP returned to work	11		(11)		
Omitted in error last year					
Eliminated from Census					
Refund of contributions	(82)	(63)			(145)
Deaths	(5)	(1)	(1)	(49)	(56)
Included in error last year					
Adjustment for multiple records				(4)	(4)
Number of members as of June 30, 2019	4,446	755	208	2,407	7,816

ACTIVES CENSUS BY AGE:

Age	Number Male	Number Female	Total Number	Average Salary	Total Salary
16 - 20	26	0	26	32,718	850,656
21 - 25	419	21	440	37,090	16,319,510
26 - 30	707	34	741	41,889	31,039,768
31 - 35	751	44	795	47,396	37,680,066
36 - 40	663	53	716	54,052	38,701,378
41 - 45	571	31	602	60,900	36,661,984
46 - 50	565	43	608	68,152	41,436,286
51 - 55	299	26	325	71,190	23,136,676
56 - 60	110	23	133	73,329	9,752,699
61 - 65	42	10	52	78,074	4,059,834
66 - 70	5	1	6	90,314	541,882
71 - 75	2	0	2	116,617	233,233
TOTAL	4,160	286	4,446	54,074	240,413,972

THE ACTIVE CENSUS INCLUDES 2,090 ACTIVES WITH VESTED BENEFITS, INCLUDING 55 ACTIVE FORMER DROP PARTICIPANTS. THE 208 CURRENT DROP PARTICIPANTS ARE EXCLUDED.

DROP PARTICIPANTS:

Age	Number Male	Number Female	Total Number	Average Benefit	Total Benefit
46 - 50	25	0	25	65,546	1,638,645
51 - 55	90	8	98	63,093	6,183,106
56 - 60	68	2	70	65,013	4,550,895
61 - 65	12	2	14	66,777	934,873
66 - 70	1	0	1	65,986	65,986
TOTAL	196	12	208	64,296	13,373,505

TERMINATED MEMBERS DUE A DEFERRED RETIREMENT BENEFIT:

Age	Number Male	Number Female	Total Number	Average Benefit	Total Benefit
31 - 35	2	0	2	20,664	41,328
36 - 40	11	2	13	26,661	346,598
41 - 45	19	1	20	25,501	510,025
46 - 50	21	0	21	27,357	574,494
51 - 55	24	2	26	30,011	780,275
56 - 60	2	0	2	82,562	165,123
TOTAL	79	5	84	28,784	2,417,843

TERMINATED MEMBERS DUE A REFUND OF CONTRIBUTIONS:

Contributions Ranging From		To	Number	Total Contributions
0	-	99	63	3,201
100	-	499	175	44,846
500	-	999	70	48,574
1000	-	1999	66	93,958
2000	-	4999	104	340,981
5000	-	9999	89	648,110
10000	-	19999	52	739,356
20000	-	99999	51	1,528,167
Greater than 99999			1	107,007
TOTAL			671	3,554,200

REGULAR RETIREES:

Age	Number Male	Number Female	Total Number	Average Benefit	Total Benefit
46 - 50	25	1	26	50,355	1,309,229
51 - 55	168	9	177	51,404	9,098,516
56 - 60	393	15	408	51,028	20,819,301
61 - 65	393	20	413	50,436	20,830,192
66 - 70	334	10	344	44,450	15,290,862
71 - 75	250	7	257	38,728	9,953,188
76 - 80	144	1	145	38,992	5,653,847
81 - 85	71	0	71	33,666	2,390,256
86 - 90	29	0	29	25,721	745,913
91 - 99	18	0	18	26,516	477,279
TOTAL	1,825	63	1,888	45,852	86,568,583

DISABILITY RETIREES:

Age	Number Male	Number Female	Total Number	Average Benefit	Total Benefit
41 - 45	8	2	10	27,106	271,060
46 - 50	18	1	19	28,738	546,019
51 - 55	22	3	25	24,384	609,604
56 - 60	19	2	21	22,883	480,547
61 - 65	20	1	21	20,335	427,037
66 - 70	18	2	20	20,895	417,903
71 - 75	8	0	8	20,367	162,936
76 - 80	4	0	4	13,464	53,854
81 - 85	6	0	6	12,845	77,072
86 - 90	4	0	4	20,495	81,979
TOTAL	127	11	138	22,667	3,128,011

SURVIVORS:

Age	Number Male	Number Female	Total Number	Average Benefit	Total Benefit
0 - 25	15	26	41	5,587	229,059
26 - 30	0	2	2	20,618	41,236
31 - 35	1	1	2	23,924	47,847
36 - 40	0	5	5	24,887	124,435
41 - 45	1	6	7	25,843	180,900
46 - 50	1	14	15	27,657	414,848
51 - 55	1	15	16	25,353	405,648
56 - 60	1	23	24	29,908	717,797
61 - 65	2	27	29	29,327	850,488
66 - 70	0	52	52	23,863	1,240,888
71 - 75	1	39	40	19,312	772,469
76 - 80	0	47	47	21,649	1,017,492
81 - 85	0	46	46	19,967	918,489
86 - 90	0	44	44	16,190	712,369
91 - 99	0	11	11	16,048	176,529
TOTAL	23	358	381	20,605	7,850,494

ACTIVE MEMBERS:

Attained Ages	Completed Years of Service											
	0	1	2	3	4	5- 9	10-14	15-19	20-24	25-29	30&Over	Total
0 - 20	19	7										26
21 - 25	119	98	74	86	40	23						440
26 - 30	83	72	99	90	75	298	24					741
31 - 35	41	31	50	61	57	270	277	8				795
36 - 40	23	13	23	28	24	157	245	187	16			716
41 - 45	10	7	8	4	10	81	124	190	162	6		602
46 - 50	9	5	3	8	6	40	66	127	227	116	1	608
51 - 55	1		2	5	1	22	30	59	91	96	18	325
56 - 60						8	13	26	22	36	28	133
61 - 65							3	17	7	9	16	52
66 - 70								1		1	4	6
71 & Over											2	2
Totals	305	233	259	282	213	899	782	615	525	264	69	4,446

AVERAGE ANNUAL SALARY OF ACTIVE MEMBERS:

Attained Ages	Completed Years of Service											Average Salary
	0	1	2	3	4	5- 9	10-14	15-19	20-24	25-29	30&Over	
0 - 20	32,814	32,455										32,718
21 - 25	31,938	34,435	40,038	41,382	40,793	43,085						37,090
26 - 30	33,128	35,301	39,986	41,801	42,038	45,837	50,643					41,889
31 - 35	32,474	36,636	44,227	42,091	44,166	47,396	52,857	59,788				47,396
36 - 40	33,413	41,559	39,746	42,488	45,982	48,418	57,694	60,629	69,420			54,052
41 - 45	38,196	35,203	40,048	51,862	43,930	51,208	56,637	62,740	71,124	75,485		60,900
46 - 50	40,890	49,093	33,645	46,533	40,992	51,266	58,945	65,312	73,363	78,782	75,808	68,152
51 - 55	51,554		57,426	39,375	49,744	50,571	56,508	62,201	78,726	79,773	79,098	71,190
56 - 60						55,701	55,970	61,462	71,828	82,815	86,426	73,329
61 - 65							59,948	68,325	75,898	99,626	80,659	78,074
66 - 70								38,539		77,478	106,466	90,314
71 & Over											116,617	116,617
Average	33,033	35,671	40,861	42,038	42,913	47,615	55,637	62,600	73,451	80,323	85,060	54,074

TERMINATED MEMBERS DUE A DEFERRED RETIREMENT BENEFIT:

Attained Ages	Years Until Retirement Eligibility											
	0	1	2	3	4	5- 9	10-14	15-19	20-24	25-29	30&Over	Total
0 - 30												0
31 - 35									2			2
36 - 40								13				13
41 - 45						1	19					20
46 - 50		3				18						21
51 - 55	3	9	5	2	7							26
56 - 60	2											2
61 & Over												0
Totals	5	12	5	2	7	19	19	13	2	0	0	84

AVERAGE ANNUAL BENEFITS OF TERMINATED MEMBERS DUE A DEFERRED RETIREMENT BENEFIT:

Attained Ages	Years Until Retirement Eligibility											Average Benefit
	0	1	2	3	4	5- 9	10-14	15-19	20-24	25-29	30&Over	
0 - 30												0
31 - 35									20,664			20,664
36 - 40								26,661				26,661
41 - 45						54,830	23,958					25,501
46 - 50		44,818				24,447						27,357
51 - 55	69,197	24,509	32,078	21,604	21,215							30,011
56 - 60	82,561											82,561
61 & Over												0
Average	74,543	29,586	32,078	21,604	21,215	26,046	23,958	26,661	20,664	0	0	28,784

SERVICE RETIREES:

Attained Ages	Completed Years Since Retirement											
	0	1	2	3	4	5- 9	10-14	15-19	20-24	25-29	30&Over	Total
0 - 50	7	5	9	4	1							26
51 - 55	44	25	27	27	16	31	7					177
56 - 60	32	26	44	29	46	163	67	1				408
61 - 65	19	17	14	22	32	163	114	29	2	1		413
66 - 70	6	2	2	5	4	64	101	125	22	13		344
71 - 75		2	2		1	17	35	94	76	14	16	257
76 - 80						3	8	25	59	27	23	145
81 - 85						1	1	4	13	18	34	71
86 - 90								1	1	1	26	29
91 & Over										2	16	18
Totals	108	77	98	87	100	442	333	279	173	76	115	1,888

AVERAGE ANNUAL BENEFITS PAYABLE TO SERVICE RETIREES:

Attained Ages	Completed Years Since Retirement											Average Benefit
	0	1	2	3	4	5- 9	10-14	15-19	20-24	25-29	30&Over	
0 - 50	50,183	57,734	49,723	44,355	44,353							50,355
51 - 55	51,325	65,984	50,059	49,375	48,195	48,202	34,362					51,404
56 - 60	62,932	55,536	55,540	48,193	50,830	50,618	43,489	17,529				51,028
61 - 65	62,647	60,200	63,874	58,286	54,484	52,184	42,351	44,335	31,016	14,768		50,436
66 - 70	64,812	40,102	59,138	65,724	39,686	51,084	45,779	41,444	36,836	25,558		44,450
71 - 75		36,249	66,205		34,754	39,961	40,314	41,560	38,358	28,330	25,299	38,728
76 - 80						44,969	40,278	41,212	45,779	34,626	23,068	38,992
81 - 85						55,370	30,747	22,910	46,376	39,056	26,665	33,666
86 - 90								6,128	64,344	45,471	24,230	25,721
91 & Over										49,243	23,675	26,516
Average	57,431	59,199	54,977	51,943	50,906	50,656	43,153	41,285	41,363	33,230	24,789	45,852

DISABILITY RETIREES:

Attained Ages	Completed Years Since Retirement											
	0	1	2	3	4	5- 9	10-14	15-19	20-24	25-29	30&Over	Total
0 - 40												0
41 - 45	2		1	3	1	2		1				10
46 - 50	1	2	3	1		6	4	2				19
51 - 55	1			1		8	7	5	3			25
56 - 60				2		3	5	6	2	2	1	21
61 - 65				1		1	2	5	4	5	3	21
66 - 70						1		3	3	8	5	20
71 - 75									2	1	5	8
76 - 80								1		1	2	4
81 - 85								2			4	6
86 - 90									1		3	4
91 & Over												0
Totals	4	2	4	8	1	21	18	25	15	17	23	138

AVERAGE ANNUAL BENEFITS PAYABLE TO DISABILITY RETIREES:

Attained Ages	Completed Years Since Retirement											Average Benefit
	0	1	2	3	4	5- 9	10-14	15-19	20-24	25-29	30&Over	
0 - 40												0
41 - 45	32,327		27,476	31,407	32,640	18,513		15,044				27,106
46 - 50	39,373	39,718	26,275	20,092		39,630	17,003	11,250				28,738
51 - 55	30,874			24,479		30,297	24,580	17,321	17,736			24,384
56 - 60				46,440		19,736	27,676	21,865	10,930	11,323	14,379	22,883
61 - 65				25,265		19,788	28,679	19,859	20,645	16,943	19,345	20,335
66 - 70						42,439		29,592	20,150	16,923	18,170	20,895
71 - 75									19,082	32,280	18,498	20,367
76 - 80								9,952		17,762	13,070	13,463
81 - 85								9,396			14,570	12,845
86 - 90									36,337		15,214	20,495
91 & Over												0
Average	33,725	39,718	26,575	32,117	32,640	30,410	24,212	18,886	19,507	17,223	16,775	22,667

SURVIVING BENEFICIARIES OF FORMER MEMBERS:

Attained Ages	Completed Years Since Retirement											
	0	1	2	3	4	5- 9	10-14	15-19	20-24	25-29	30&Over	Total
0 - 20		10	2		3	10	6	3	2			36
21 - 25		1			1	2	1					5
26 - 30		1			1							2
31 - 35			1			1						2
36 - 40		1	1			2	1					5
41 - 45		1				2	2		1		1	7
46 - 50	1	1				4	3	2	3	1		15
51 - 55	1				1	6	2	4	1	1		16
56 - 60				2	1	6	7	2	5	1		24
61 - 65			1			3	11	4	5	1	4	29
66 - 70			1		1	3	8	10	15	8	6	52
71 - 75							1	8	12	6	13	40
76 - 80							3	5	11	7	21	47
81 - 85								3	2	7	34	46
86 - 90								1	2	2	39	44
91 & Over											11	11
Totals	2	15	6	2	8	39	45	42	59	34	129	381

AVERAGE ANNUAL BENEFITS PAYABLE TO SURVIVORS OF FORMER MEMBERS:

Attained Ages	Completed Years Since Retirement											Average Benefit
	0	1	2	3	4	5- 9	10-14	15-19	20-24	25-29	30&Over	
0 - 20		7,155	6,175		5,556	5,877	4,003	3,769	5,836			5,731
21 - 25		5,788			5,170	5,067	1,638					4,546
26 - 30		19,013			22,222							20,618
31 - 35			15,701			32,146						23,924
36 - 40		39,898	41,164			14,776	13,820					24,887
41 - 45		35,970				32,864	21,199		35,014		1,791	25,843
46 - 50	34,033	38,590				44,830	23,966	19,023	13,458	12,585		27,657
51 - 55	26,374				34,468	31,113	40,377	16,231	2,757	9,691		25,353
56 - 60				57,765	58,647	41,616	25,816	11,127	16,742	7,250		29,908
61 - 65			86,771			38,023	29,319	31,789	23,702	25,811	13,916	29,327
66 - 70			15,421		64,092	25,245	29,130	24,272	22,374	23,221	14,749	23,863
71 - 75							34,036	16,859	22,758	23,669	14,496	19,312
76 - 80							56,043	25,700	26,374	28,301	11,079	21,649
81 - 85								5,378	42,453	31,783	17,499	19,967
86 - 90								2,962	24,844	21,307	15,823	16,190
91 & Over											16,048	16,048
Average	30,204	14,054	28,568	57,765	25,158	25,688	26,065	18,783	22,465	24,892	15,160	20,605

EXHIBIT IX
YEAR-TO-YEAR COMPARISON

	Fiscal 2019	Fiscal 2018	Fiscal 2017	Fiscal 2016
Number of Active Members	4,446	4,424	4,429	4,362
Number of Retirees & Survivors	2,407	2,327	2,289	2,213
DROP Participants	208	192	173	173
Number of Terminated Due Deferred Benefits	84	76	72	72
Number Terminated Due Refunds	671	656	597	558
Active Lives Payroll (excludes DROP participants)	$ 240,413,972	$ 236,005,445	$ 232,500,397	$ 225,301,112
Retiree Benefits in Payment	$ 97,547,088	$ 91,808,883	$ 88,444,685	$ 83,899,034
Market Value of Assets	$ 1,778,931,314	$ 1,704,049,168	$ 1,593,696,648	$ 1,399,892,212
Ratio of Actuarial Value of Assets to Actuarial Accrued Liability	75.72%	76.40%	75.82%	75.48%
Actuarial Accrued Liability (EAN)	$ 2,405,122,324	$ 2,279,256,967	$ 2,166,881,556	$ 2,053,982,618
Actuarial Value of Assets	$ 1,821,040,904	$ 1,741,451,961	$ 1,643,007,075	$ 1,550,261,745
UAL (Funding Excess)	$ 584,081,420	$ 537,805,006	$ 523,874,481	$ 503,720,873
P.V. of Future Employer Normal Contributions	$ 352,991,474	$ 346,076,765	$ 328,942,059	$ 305,570,473
Present Value of Future Employee Contrib.	$ 243,350,511	$ 240,713,969	$ 238,106,260	$ 230,423,085
Present Value of Future Benefits	$ 3,001,464,309	$ 2,866,047,701	$ 2,733,929,875	$ 2,589,976,176

	Fiscal 2020	Fiscal 2019	Fiscal 2018	Fiscal 2017
Employee Contribution Rate Above Poverty Level	10.00%	10.00%	10.00%	10.00%
Required Tax Contributions as a Percentage of Projected Payroll	11.38%	11.04%	10.85%	10.91%
Actuarially Required Employer Contribution as a Percentage of Projected Payroll	31.78%	28.32%	28.67%	27.09%
Actual Employer Contribution as a Percentage of Projected Payroll	27.75%	26.50%	26.50%	25.25%

* The above rates are for members with earnings greater than the Department of HHS poverty guidelines. For members with earnings below the poverty guidelines, employer rates will be 2.0% higher and employee rates will be 2.0% lower.

Fiscal 2015	Fiscal 2014	Fiscal 2013	Fiscal 2012	Fiscal 2011	Fiscal 2010
4,192	4,098	4,063	4,056	4,020	3,989
2,139	2,057	1,958	1,875	1,802	1,749
166	185	221	217	225	162
81	9	71	70	68	59
523	472	450	398	418	442
$ 211,963,892	$ 203,333,976	$ 199,129,982	$ 198,112,999	$ 193,136,985	$ 189,542,210
$ 79,924,818	$ 73,404,453	$ 67,678,016	$ 62,975,274	$ 58,699,965	$ 56,056,554
$ 1,419,138,769	$ 1,410,307,198	$ 1,253,213,084	$ 1,122,864,548	$ 1,154,482,040	$ 971,775,080
76.09%	74.66%	71.13%	71.66%	74.33%	74.21%
$ 1,958,850,006	$ 1,855,298,538	$ 1,771,931,777	$ 1,700,643,083	$ 1,621,007,988	$ 1,536,258,543
$ 1,490,408,510	$ 1,385,135,204	$ 1,260,348,240	$ 1,218,618,308	$ 1,204,830,245	$ 1,140,054,175
$ 468,441,496	$ 470,163,334	$ 511,583,537	$ 482,024,775	$ 416,177,743	$ 396,204,368
$ 286,640,979	$ 315,734,786	$ 310,702,226	$ 325,616,184	$ 305,540,215	$ 335,984,027
$ 216,351,986	$ 213,279,261	$ 210,842,508	$ 211,015,125	$ 206,989,105	$ 160,939,180
$ 2,461,842,971	$ 2,384,312,585	$ 2,294,778,794	$ 2,223,486,329	$ 2,133,537,308	$ 2,033,181,750

Fiscal 2016	Fiscal 2015	Fiscal 2014	Fiscal 2013	Fiscal 2012	Fiscal 2011
10.00%	10.00%	10.00%	10.00%	10.00%	8.00%
11.33%	11.39%	11.05%	10.72%	10.93%	11.09%
25.44%	27.50%	29.23%	27.77%	24.02%	24.97%
27.25%	29.25%	28.25%	24.00%	23.25%	21.50%

SUMMARY OF PRINCIPAL PLAN PROVISIONS

The Firefighters' Retirement System was established as of January 1, 1980, for the purpose of providing retirement allowances and other benefits as described under R.S. 11:2256 - 11:2259. The following summary of plan provisions is for general informational purposes only and does not constitute a guarantee of benefits.

MEMBERSHIP - All full time firefighters or any person in a position as defined in the municipal fire and police civil service system who is employed by a fire department of any municipality, parish, or fire protection district of the State of Louisiana, except Orleans, and East Baton Rouge Parishes, who earns at least three hundred seventy-five dollars per month excluding state supplemental pay are required to be members of this retirement system. Employees of the system are eligible, at their option to become members of the system. Persons must be under the age of fifty to be eligible for system membership unless they become members through merger.

CONTRIBUTION RATES - Under the provisions of R.S. 11:62, 11:103, and 22:1476A(3), the fund is financed by a combination of employee contributions, employer contributions, and insurance premium taxes. The employee contribution rate is set by R.S. 11:62 but cannot be less than 8% or more than 10% of earnable compensation. The employee contribution rate is fixed at 8% for members whose earnable compensation is less than or equal to the poverty guidelines issued by the U. S. Department of Health and Human Services. Gross employer contributions are determined by actuarial valuation and are subject to change each year in accordance with R. S. 11:103, 11:105, 11:107 and 11:107.1. The employee contribution rate is set at 8% when gross employer contributions total 25% or less of earnable compensation. The employee rate then increases 0.25% for each 0.75% increase in the total rate, subject to a maximum rate of 10%. Insurance premium taxes are allocated to the system based on available funds and the statutory provisions as described in R.S. 22:1476A(3).

CONTRIBUTION REFUNDS - Upon withdrawal from service, members not entitled to a retirement allowance may receive a refund of accumulated contributions. Refunds are payable ninety days after the effective date of withdrawal from service.

RETIREMENT BENEFITS - Members with twelve years of creditable service may retire at age fifty-five; members with twenty years of service may retire at age fifty; members with twenty-five years of service may retire regardless of age, provided that they have been a member of this system for at least one year. The retirement allowance is equal to three and one-third percent of the member's average final compensation multiplied by his years of creditable service, not to exceed one hundred percent of his average final compensation.

OPTIONAL ALLOWANCES - Members may receive their benefits as a life annuity, or in lieu of such receive a reduced benefit according to the option selected which is the actuarial equivalent of the maximum benefit.

Option 1 - If the member dies before he has received in annuity payments the present value of his member's annuity as it was at the time of retirement the balance is paid to his beneficiary.

Option 2 - Upon retirement, the member receives a reduced benefit. Upon the member's death, the designated beneficiary will continue to receive the same reduced benefit.

Option 3 - Upon retirement, the member receives a reduced benefit. Upon the member's death, the designated beneficiary will receive one-half of the member's reduced benefit.

Option 4 - Upon retirement, the member elects to receive a board approved benefit payable to the member, the member's spouse, or the member's dependent child, which is actuarially equivalent to the maximum benefit.

A member may also elect to receive an actuarially reduced benefit which provides for an automatic 2 ½% annual compound increase in monthly retirement benefits based on the reduced benefit and commencing on the later of age fifty-five or retirement anniversary; this COLA is in addition to any ad hoc COLAs which are payable.

Initial Benefit Option – This option is available only to regular retirees who have not participated in the Deferred Retirement Option Plan. Under this option members may receive an initial benefit plus a reduced monthly retirement allowance which, when combined, equal the actuarially equivalent amount of the maximum retirement allowance. The initial benefit may not exceed an amount equal to thirty-six payments of the member's maximum retirement allowance. The initial benefit can be paid either as a lump-sum payment or placed in an account called an "initial benefit account" with interest credited thereto and monthly payments made from the account.

DISABILITY BENEFITS - Any member who has been officially certified as totally disabled solely as the result of injuries sustained in the performance of his official duties, or for any cause, provided the member has a least five years of creditable service and provided that the disability was incurred while the member was an active contributing member, is entitled to disability benefits. Any member under the age of fifty who becomes totally disabled will receive a disability benefit equal to 60% of final compensation for an injury received in the line of duty; or 75% of his accrued retirement benefit with a minimum of 25% of average salary for any injury received, even though not in the line of duty. Any member age fifty or older who becomes totally disabled from an injury sustained in the line of duty is entitled to a disability benefit equal to the greater of 60% of final compensation or his accrued retirement benefit. Any member age fifty or older who becomes totally disabled as a result of any injury, even though not in the line of duty, is entitled to a disability benefit equal to his accrued retirement benefit with a minimum of 25% of average salary. The surviving spouse of a member who was on disability retirement at the time of death receives a benefit of $200 per month. When the member takes disability retirement, he may in addition take an actuarially reduced benefit in which case the member's surviving spouse receives 50% of the disability benefit being paid immediately prior to the death of the disability retiree. The retirement system may reduce benefits paid to a disability retiree who is also receiving workers compensation payments.

SURVIVOR BENEFITS - Benefits are payable to survivors of a deceased member who dies and is not eligible for retirement as follows. If any member is killed in the line of duty and leaves a surviving eligible spouse, the spouse is entitled to an annual benefit equal to two-thirds of the deceased member's final compensation. If any member dies from a cause not in the line of duty, the surviving spouse is entitled to an annual benefit equal to 3% of the deceased member's average final compensation multiplied by his total years of creditable service; however, in no event is the annual benefit less than 40% nor more than 60% of the deceased member's average final compensation. Children of the deceased member who are under the age of eighteen years are entitled to the greater of $200 per month or 10% of average final compensation (not to exceed 100% of average final compensation) until reaching the age of eighteen or until the age of twenty-two if enrolled full-time in

an institution of higher learning, unless the surviving child is physically handicapped or mentally retarded in which case the benefit is payable regardless of age. If a deceased member dies leaving no surviving spouse, but at least one minor child, each child is entitled to receive forty percent of the deceased's average final compensation, not to exceed an aggregate of sixty percent of average final compensation.

DEFERRED RETIREMENT OPTION PLAN - In lieu of terminating employment and accepting a service retirement allowance, any member of the system who has at least twenty years of creditable service and who is eligible to receive a service retirement allowance may elect to participate in the deferred retirement option plan for up to thirty-six months and defer the receipt of benefits. Upon commencement of participation in the plan, membership in the system terminates and neither the employee nor employer contributions are payable. Compensation and creditable service will remain as they existed on the effective date of commencement of participation in the plan. The monthly retirement benefits that would have been payable, had the member elected to cease employment and receive a service retirement allowance, are paid into the deferred retirement option plan account. Upon termination of employment at the end of the specified period of participation, a participant in the program may receive, at his option, a lump sum payment from the account equal to the payments to the account, or a true annuity based upon his account, or he may elect any other method of payment if approved by the Board of Trustees. The monthly benefits that were being paid into the fund during the period of participation will begin to be paid to the retiree. If employment is not terminated at the end of the thirty-six months, payments into the account cease and the member resumes active contributing membership in the system. If the participant dies during the period of participation in the program, a lump sum payment equal to his account balance is paid to his named beneficiary or, if none, to his estate; in addition, normal survivor benefits are payable to survivors of retirees.

COST OF LIVING INCREASES - The Board of Trustees is authorized to grant retired members and widows of members who have retired an annual cost of living increase of up to 3% of their current benefit, and all retired members and widows who are sixty-five years of age and older a 2% increase in their original benefit. In order for the Board to grant either of these increases the system must meet certain criteria detailed in the statute related to funding status and interest earnings. In lieu of these cost of living adjustments the Board may also grant an increase in the form based on a formula equal to up to $1 times the total of the number of years of credited service accrued at retirement or at death of the member or retiree plus the number of years since retirement or since death of the member or retiree to the system's fiscal year end preceding the payment of the benefit increase.

ACTUARIAL ASSUMPTIONS

In determining actuarial costs, certain assumptions must be made regarding future experience under the plan. These assumptions include the rate of investment return, mortality of plan members, rates of salary increase, rates of retirement, rates of termination, rates of disability, and various other factors that have an impact on the cost of the plan. To the extent that future experience varies from the assumptions selected for valuation, future costs will be either higher or lower than anticipated. The following chart illustrates the effect of emerging experience on the plan.

Factor	Increase in Factor Results in
Investment Earnings Rate	Decrease in Cost
Annual Rate of Salary Increase	Increase in Cost
Rates of Retirement	Increase in Cost
Rates of Termination	Decrease in Cost
Rates of Disability	Increase in Cost
Rates of Mortality	Decrease in Cost

ACTUARIAL COST METHOD:	Individual Entry Age Normal With Allocation of Cost Based on Earnings. Entry and Attained Ages Calculated on an Age Near Birthday Basis.
VALUATION INTEREST RATE:	7.15% (Net of investment expense)
ACTUARIAL ASSET VALUES:	All assets are valued at market value adjusted to defer four-fifths of all earnings above or below the valuation interest rate in the valuation year, three-fifths of all earnings above or below the valuation interest rate in the prior year, two-fifths of all earnings above or below the valuation interest rate from two years prior, and one-fifth of all earnings above or below the valuation interest rate from three years prior. The resulting smoothed values are subject to a corridor of 85% to 115% of the market value of assets. If the smoothed value falls outside the corridor, the actuarial value is set equal to the average of the corridor limit and the smoothed value.
ACTIVE, ANNUITANT AND BENEFICIARY MORTALITY:	RP-2000 Combined Healthy with Blue Collar Adjustment Sex Distinct Mortality Tables Projected to 2031 using Scale AA
RETIREE COST OF LIVING INCREASES:	The present value of future retirement benefits is based on benefits currently being paid by the system and includes previously granted cost of living increases. The present values do not

include provisions for potential future increases not yet authorized by the Board of Trustees.

ANNUAL SALARY INCREASE RATE: Salary increases include 2.5% inflation and merit increases. The gross rates including inflation and merit increases are as follows:

Years of Service	Salary Growth Rate
1 – 2	14.75%
3 – 14	5.50%
15 – 24	5.00%
25 & over	4.50%

RETIREMENT RATES: The table of these rates is included later in the report. These rates apply only to those individuals eligible to retire.

RETIREMENT LIMITATIONS: Projected retirement benefits are not subject to IRS Section 415 limits.

DROP ENTRY RATES: The table of these rates is included later in the report. These rates apply only to those individuals eligible to participate.

DROP PARTICIPATION PERIOD: All DROP participants are assumed to participate for 3 years and retire at the end of this participation period.

RETIREMENT RATES FOR ACTIVE FORMER DROP PARTICIPANTS: Retirement rates for active former DROP participants are as follows:

Ages	Retirement Rates
Under 75	0.25
75 & Over	1.00

DISABILITY RATES: 55% of the disability rates used for the 21st valuation of the Railroad Retirement System for individuals with 10-19 years of service. The table of these rates is included later in the report. 20% of total disabilities are assumed to be in the line of duty.

WITHDRAWAL RATES: The rates of withdrawal are applied based upon years of service according to the following table:

Service Duration (≤)	Factor	Service Duration(≤)	Factor
1	0.075	7	0.050
2	0.065	8	0.040
3	0.065	9	0.030
4	0.065	10	0.020
5	0.050	>10	0.010
6	0.050		

Note: The withdrawal rate for individuals eligible to retire is assumed to be zero.

MARRIAGE STATISTICS: 70% of the members are assumed to be married; husbands are assumed to be three years older than wives.

SERVICE RELATED DEATH: 20% of Total Deaths

FAMILY STATISTICS: Assumptions utilized in determining the costs of various survivor benefits as listed below, are derived from the information provided in the 2010 U. S. Census:

Member's Age	% With Children	Number of Children	Average Age
25	70%	1.84	5
35	86%	2.13	9
45	75%	1.70	12
55	22%	1.42	14
65	4%	1.45	15

DISABLED LIVES MORTALITY: RP-2000 Disabled Lives Mortality Tables set back 5 years for males and set back 3 years for females

VESTING ELECTING PERCENTAGE: 70% of those vested elect deferred benefits in lieu of contribution refunds.

ACTUARIAL TABLES AND RATES

Age	Male Mortality Rates	Female Mortality Rates	Male Disabled Mortality Rates	Female Disabled Mortality Rates	Retirement Rates	DROP Entry Rates	Disability Rates
18	0.00017	0.00012	0.02257	0.00745	0.000000	0.000000	0.000825
19	0.00018	0.00012	0.02257	0.00745	0.000000	0.000000	0.000825
20	0.00019	0.00012	0.02257	0.00745	0.000000	0.000000	0.000825
21	0.00020	0.00011	0.02257	0.00745	0.000000	0.000000	0.000825
22	0.00022	0.00011	0.02257	0.00745	0.000000	0.000000	0.000825
23	0.00023	0.00012	0.02257	0.00745	0.000000	0.000000	0.000825
24	0.00025	0.00013	0.02257	0.00745	0.000000	0.000000	0.000825
25	0.00028	0.00013	0.02257	0.00745	0.000000	0.000000	0.000825
26	0.00031	0.00015	0.02257	0.00745	0.000000	0.000000	0.000825
27	0.00033	0.00015	0.02257	0.00745	0.000000	0.000000	0.000825
28	0.00034	0.00016	0.02257	0.00745	0.000000	0.000000	0.000825
29	0.00035	0.00017	0.02257	0.00745	0.000000	0.000000	0.000825
30	0.00062	0.00021	0.02257	0.00745	0.000000	0.000000	0.000825
31	0.00068	0.00026	0.02257	0.00745	0.000000	0.000000	0.000825
32	0.00075	0.00029	0.02257	0.00745	0.000000	0.000000	0.000825
33	0.00081	0.00031	0.02257	0.00745	0.000000	0.000000	0.000825
34	0.00087	0.00034	0.02257	0.00745	0.000000	0.000000	0.000825
35	0.00093	0.00037	0.02257	0.00745	0.000000	0.000000	0.000935
36	0.00098	0.00040	0.02257	0.00745	0.000000	0.000000	0.001045
37	0.00103	0.00043	0.02257	0.00745	0.000000	0.000000	0.001155
38	0.00105	0.00046	0.02257	0.00745	0.000000	0.000000	0.001320
39	0.00106	0.00050	0.02257	0.00745	0.000000	0.000000	0.001485
40	0.00107	0.00055	0.02257	0.00745	0.000000	0.000000	0.001705
41	0.00108	0.00061	0.02257	0.00745	0.060000	0.150000	0.001925
42	0.00110	0.00067	0.02257	0.00745	0.060000	0.150000	0.002145
43	0.00113	0.00074	0.02257	0.00745	0.060000	0.150000	0.002420
44	0.00116	0.00080	0.02257	0.00745	0.060000	0.150000	0.002750
45	0.00120	0.00084	0.02257	0.00745	0.060000	0.150000	0.003135
46	0.00122	0.00088	0.02257	0.00745	0.060000	0.150000	0.003575
47	0.00126	0.00091	0.02257	0.00745	0.060000	0.150000	0.004015
48	0.00129	0.00097	0.02257	0.00745	0.060000	0.150000	0.004565
49	0.00133	0.00104	0.02257	0.00818	0.060000	0.150000	0.005170
50	0.00137	0.00115	0.02257	0.00896	0.060000	0.170000	0.005885
51	0.00151	0.00127	0.02385	0.00978	0.060000	0.170000	0.006710
52	0.00160	0.00145	0.02512	0.01063	0.060000	0.170000	0.007590
53	0.00176	0.00166	0.02640	0.01154	0.060000	0.170000	0.008635
54	0.00195	0.00190	0.02769	0.01248	0.060000	0.170000	0.009790
55	0.00232	0.00218	0.02897	0.01346	0.060000	0.170000	0.011110
56	0.00283	0.00254	0.03027	0.01446	0.060000	0.170000	0.012650
57	0.00331	0.00290	0.03156	0.01550	0.060000	0.170000	0.014355
58	0.00388	0.00325	0.03286	0.01654	0.060000	0.170000	0.016280
59	0.00440	0.00369	0.03415	0.01760	0.060000	0.170000	0.018535
60	0.00502	0.00424	0.03544	0.01865	0.060000	0.170000	0.026840
61	0.00590	0.00496	0.03673	0.01971	0.060000	0.170000	0.026840
62	0.00674	0.00581	0.03803	0.02077	0.060000	0.170000	0.026840
63	0.00795	0.00683	0.03933	0.02184	0.060000	0.170000	0.026840
64	0.00892	0.00782	0.04067	0.02294	0.060000	0.170000	0.026840
65	0.01004	0.00890	0.04204	0.02408	0.500000	0.170000	0.026840
66	0.01170	0.01013	0.04347	0.02529	0.500000	0.170000	0.026840
67	0.01303	0.01131	0.04498	0.02660	0.500000	0.170000	0.026840
68	0.01400	0.01260	0.04658	0.02803	0.500000	0.170000	0.026840
69	0.01547	0.01403	0.04831	0.02959	0.500000	0.170000	0.026840
70	0.01675	0.01595	0.05017	0.03132	0.500000	0.000000	0.026840
71	0.01836	0.01721	0.05221	0.03323	0.500000	0.000000	0.026840
72	0.02015	0.01914	0.05445	0.03533	0.500000	0.000000	0.026840
73	0.02216	0.02056	0.05691	0.03764	0.500000	0.000000	0.026840
74	0.02444	0.02267	0.05961	0.04014	0.500000	0.000000	0.026840
75	0.02786	0.02408	0.06258	0.04285	0.500000	0.000000	0.026840

PRIOR YEAR ASSUMPTIONS

VALUATION INTEREST RATE: 7.30% (Net of investment expense)

INFLATION RATE: 2.7%

ANNUAL SALARY INCREASE RATE: Salary increases include 2.7% inflation and merit increases. The gross rates including inflation and merit increases are as follows:

Years of Service	Salary Growth Rate
1 – 2	15.000%
3 – 14	5.750%
15 – 24	5.250%
25 & over	4.750%

GLOSSARY

Accrued Benefit – The pension benefit that an individual has earned as of a specific date based on the provisions of the plan and the individual's age, service, and salary as of that date.

Actuarial Accrued Liability – The actuarial present value of benefits payable to members of the fund less the present value of future normal costs attributable to the members.

Actuarial Assumptions - Assumptions as to the occurrence of future events affecting pension costs. These assumptions include rates of mortality, withdrawal, disablement, and retirement. Also included are rates of investment earnings, changes in compensation, as well as statistics related to marriage and family composition.

Actuarial Cost Method – A procedure for determining the portion of the cost of a pension plan to be allocated to each year. Each cost method allocates a certain portion of the actuarial present value of benefits between the actuarial accrued liability and future normal costs. Once this allocation is made, a determination of the normal cost attributable to a specific year can be made along with the payment to amortize any unfunded actuarial accrued liability. To the extent that a particular funding method allocates a greater (lesser) portion of the actual present value of benefits to the actuarial accrued liability it will allocate less (more) to future normal costs.

Actuarial Equivalence – Payments or receipts with equal actuarial value on a given date when valued using the same set of actuarial assumptions.

Actuarial Gain (Loss) – The financial effect on the fund of the difference between the expected and actual experience of the fund. The experience may be related to investment earnings above (or below) those expected or changes in the liability structure due to fewer (or greater) than the expected numbers of retirements, deaths, disabilities, or withdrawals. In addition, other factors such as pay increases above (or below) those forecast can result in actuarial gains or losses. The effect of such gains (or losses) is to decrease (or increase) future costs.

Actuarial Present Value - The value, as of a specified date, of an amount or series of amounts payable or receivable thereafter, with each amount adjusted to reflect the time value of money (through accrual of interest) and the probability of payments. For example: if $600 invested today will be worth $1,000 in 10 years and there is a 50% probability that a person will live 10 years, then the actuarial present value of $1,000 payable to that person if he should survive 10 years is $300.

Actuarial Value of Assets - The value of cash, investments, and other property belonging to the pension plan as used by the actuary for the purpose of the actuarial valuation. This may correspond to the book value, market value, or some modification involving either or both book and market value. Adjustments to market values are often made to reduce the volatility of asset values.

Asset Gain (Loss) - That portion of the actuarial gain attributable to investment performance above (below) the expected rate of return in the actuarial assumptions.

Amortization Payment - That portion of the pension plan contribution designated to pay interest and reduce the outstanding principal balance of unfunded actuarial accrued liability. If the amortization payment is less than the accrued interest on the unfunded actuarial accrued liability the outstanding principal balance will increase.

Contribution Shortfall (Excess) - The difference between contributions recommended in the prior valuation and the actual amount received.

Decrements – Events which result in the termination of membership in the system such as retirement, disability, withdrawal, or death.

Employer Normal Cost - That portion of the normal cost not attributable to employee contributions. It includes both direct contributions made by the employer and contributions from other non-employee sources such as revenue sharing and revenues related to taxes.

Funded Ratio – A measure of the ratio of assets to liabilities of the system according to a specific definition of those two values. Typically the assets used in the measure are the actuarial value of assets; the liabilities are defined by reference to some recognized actuarial funding method. Thus the funded ratio of a plan depends not only on the financial strength of the plan but also on the funding method used to determine the liabilities and the asset valuation method used to determine the assets in the ratio.

Normal Cost - That portion of the actuarial present value of pension plan benefits and expenses allocated to a valuation year by the actuarial cost method. This is analogous to one year's insurance premium.

Pension Benefit Obligation - The actuarial present value of benefits earned or credited to date based on the members expected final average compensation at retirement. For current retirees or terminated members this is equivalent to the actuarial present value of their accrued benefit.

Projected Benefits – The benefits expected to be paid in the future based on the provisions of the plan and the actuarial assumptions. The projected values are based on anticipated future advancement in age and accrual of service as well as increases in salary paid to the participant.

Unfunded Actuarial Accrued Liability - The excess of the actuarial accrued liability over the actuarial value of assets.

Vested Benefits - Benefits that the members are entitled to even if they withdraw from service.