GRS Gabriel Roeder Smith & Company
Consultants & Actuaries

EDUCATIONAL EMPLOYEES' SUPPLEMENTARY RETIREMENT SYSTEM OF FAIRFAX COUNTY (ERFC)

5-YEAR EXPERIENCE STUDY
JANUARY 1, 2010 THROUGH DECEMBER 31, 2014

ACTUARIAL INVESTIGATION REPORT
JANUARY 1, 2010-DECEMBER 31, 2014

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November 10, 2015

The Board of Trustees
Educational Employees' Supplementary
   Retirement System of Fairfax County
Fairfax, Virginia

Dear Board Members:

At your request, we have performed a review of the actuarial assumptions used to value the Educational Employees' Supplementary Retirement System of Fairfax County (ERFC). The primary purpose of the study is to determine the continued appropriateness of the current actuarial assumptions (used in valuing ERFC actuarial liabilities and establishing employer contribution rates). Our study was based upon the member data furnished by Retirement System staff for annual actuarial valuations during the period January 1, 2010 to December 31, 2014.
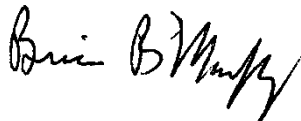
Our study includes a review of the experience associated with the following actuarial assumptions:

- Inflation
- Investment Return
- Salary Increases
- Withdrawal
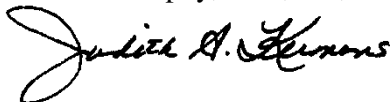- Retirement
- Disability

This report has been prepared by actuaries who have substantial experience valuing public employee retirement systems. We certify that, to the best of our knowledge, this report is complete and accurate and was made in accordance with standards of practice promulgated by the Actuarial Standards Board. The actuarial assumptions that result from this study produce results which, individually and in the aggregate, are reasonable.

Brian B. Murphy and Judith A. Kermans are Members of the American Academy of Actuaries (MAAA) and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein. The signing actuaries are independent of the plan sponsor.

Respectfully submitted,

Brian B. Murphy

Brian B. Murphy, FSA, EA, FCA, MAAA

Judith A. Kermans

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SECTION A
OVERVIEW AND ECONOMIC ASSUMPTIONS

INTRODUCTION

Each year, as of December 31, the liabilities of the Educational Employees' Supplementary Retirement System of Fairfax County are valued. In order to perform the valuation, assumptions must be made regarding the future experience of the System with regard to the following risk areas:

- Rates of **withdrawal** of active participants.

- Rates of **disability** among active participants.

- Patterns of **salary increases** to active participants.

- Rates of **retirement** among active participants.

- Rates of **mortality** among active participants, retirees, and beneficiaries.

- Long-term rates of **investment return** to be generated by the assets of the System.

Assumptions should be carefully chosen and continually monitored. A poor initial choice of assumptions or continued use of outdated assumptions can lead to:

- Understated costs resulting in either an inability to pay benefits when due, or sharp increases in required contributions at some point in the future;

- Overstated costs resulting in an unnecessarily large burden on the current generation of participants, employers and taxpayers.

A single set of assumptions will not be suitable indefinitely. Conditions change, and our understanding of conditions (whether or not they are changing) also changes.

The results of an experience study for the period January 1, 2010 to December 31, 2014 follows. No single 5-year experience period should be given full credibility in the setting of actuarial valuation assumptions. When we see significant differences between what is expected from our assumptions and actual experience, our strategy in recommending a change in assumptions is usually to select rates that would produce results somewhere between the actual and expected experience. In this way, with each experience study the actuarial assumptions become better and better representations of underlying behavior patterns. Consequently, temporary conditions that might influence a particular experience study period will not unduly influence the choice of long-term assumptions.

We have noticed that sometimes the use of new assumptions did not always reduce the size of the gain or loss in a particular decrement. Our experience has shown that sometimes this is correlated with the relative magnitude of the liability of the members that decrement, rather than number counts alone. For example, consider a plan with only two members who are both the same age and assume member one has a liability of $10,000 and member two has a liability of $90,000. If one of the members leaves and forfeits all of their liability, the net rate of decrement is one out of two for a rate of 50%. However, the net gain or loss to the System will be 10% if member one leaves versus 90% if member two leaves.

As a result, we include a column in some of our tables entitled "actual rates weighted by liability." This represents the crude rate of decrement on a liability weighted basis as opposed to strictly a number count basis. The liability weighted rates were found to be more highly correlated with withdrawal and retirement decrements than with other decrements. This makes some intuitive sense, since retirement and termination decisions are often made based on how much the members have to gain or lose if they retire or change jobs, whereas death and disability are events that happen to someone.

We are recommending certain changes in assumptions. The various assumption changes are described on the following pages. Actuarial assumptions were last revised following the December 31, 2009 regular actuarial valuation.

SUMMARY OF FINDINGS

The five-year period (January 1, 2010 to December 31, 2014) covered by this experience study provided sufficient data to form a basis for recommending changes in many of the assumptions used in the actuarial valuations of the Educational Employees' Supplementary Retirement System of Fairfax County. The recommended actuarial assumption changes resulting from this experience study are summarized below:

- Remove the age-based assumption for rates of withdrawals for males and females, and base withdrawal assumption on service only.
- Decrease the rates of expected disability for males and females.
- Decrease the rates of expected normal (unreduced) retirement for males and females.
- Decrease the rates of expected early (reduced) retirement for males and females.
- Decrease the rates of expected merit and seniority pay increases.
- Update post-retirement mortality assumptions.
- Update pre-retirement mortality assumptions.

ERFC currently assumes a spread between investment return and wage inflation of 3.75%. We estimated the effect with assumed wage inflation at 3.75% and 3.25% and assumed investment return at 7.00%, 7.25% and 7.50%. Our findings are discussed beginning on page 7.

Results based upon the recommended demographic assumptions and the range of economic assumptions we are recommending are shown in Section B.

SUMMARY OF DECREMENT ASSUMPTIONS

Background: In general, recent patterns of non-economic activity (rates of withdrawal, disability, death, retirement, and merit and seniority pay increases) tend to be reliable predictors of future experience. However, past activity will also contain anomalies (or special circumstances) that cannot be assumed to replicate in the future. The actuary attempts to identify and remove these anomalies before creating recommended rates. The goal is to identify long-term trends in activity and move the rates toward those trends as a result of the periodic investigations. In establishing our recommendations, we have considered the results of the prior study, as well as the observed trends from this study. We have also had some discussions with ERFC staff and other professionals, as needed. We also considered that experience may have been influenced by the "great recession."

Rates of Withdrawals: Based on current assumptions, withdrawals from service were studied separately for members with less than three years of service and members with three or more years of service. In addition, we studied rates of withdrawal based on service only. Actual rates of separation from employment were more closely related to service than to age. Rates were adjusted to be more in line with experience and based on service only.

Disability: Observed rates of disability were lower than assumed. The recommended rates reduce the assumption to more closely track experience.

Normal Retirement: Experience was studied separately for ERFC Legacy members and ERFC 2001 Plan members. Actual experience was below expectations for ERFC Legacy members and ERFC 2001 members based on age only. Retirement experience was found to be correlated with liability, as described on page 3. We modified the retirement rates slightly for all groups to move closer to experience. Experience for ERFC 2001 retirements under the 30 and out retirement conditions has not yet been observed. These rates were reduced in proportion to the reductions in ERFC Legacy rates.

Reduced Service Retirement: Experience indicated less reduced service retirements than assumed. Experience was found to be more correlated with liability, as described on page 3. We modified the rates slightly for all groups to move closer to experience.

Mortality: ERFC does not have sufficient experience to develop an independent mortality table. Proposed assumptions are based on recently published mortality tables: RP-2014 with MP-2014 projection scale. A nationwide study of Public Sector Retirement Systems is underway and ERFC mortality assumptions could be revisited once it is complete or once VRS completes their next experience study.

Pay Increase Rate (Merit and Longevity Portion): Pay increases were lower than assumed. The recommended rates reduce the pay assumption to more closely match experience.

Complete listings of all assumptions begin on page 29.

SUMMARY OF DECREMENT EXPERIENCE

This chart compares actual experience during 2010 to 2014 with expected experience based upon present and proposed assumptions. In some cases, the proposed assumptions were developed based upon "liability weighting" as discussed previously, so that the comparisons below (which are based upon number counts only) may seem non-intuitive.

Decrement Risk Area	Number Decrementing		
		Expected	
	Actual	Present	Proposed
Withdrawal - Total			
Male	1,015	1,025	982
Female	5,779	5,437	5,795
Disability			
Male	0	16	8
Female	5	52	26
Normal Retirement			
Male	347	436	421
Female	1,578	1,725	1,683
Early Retirement			
Male	115	139	118
Female	690	924	772

The chart below provides additional information about experience during the period that reflects liability effects. For example, a consistent pattern of liability gains is seen for retirement. However, the pattern for withdrawal (other separations) is mixed, and potentially affected by the "great recession", suggesting that recent data indicating gains should be given more weight than other data reflecting losses. This would mean that withdrawal rates could be increased slightly, since gains in that category generally reflect more terminations than expected.

ERFC Experience Gains & (Losses) By Active Member Risk Area
Comparative Statement (Effect on Liablities in $ Millions)

Experience Period	Pay Increases	Retirement	Disability & Death-In-Service	Withdrawal
2010	$ 53.1	$ 5.2	$ 0.2	$(5.3)
2011	18.8	5.3	(0.2)	(4.2)
2012	12.3	4.6	(0.3)	(3.4)
2013	16.6	5.7	0.0	2.9
2014	8.5	5.8	(0.1)	0.6
5-year total	$ 109.3	$ 26.6	$(0.4)	$(9.4)

Gains and losses from other risk areas, including investment return and post-retirement mortality, would be in addition to the figures shown in the table above.

Economic assumptions reflect the effects of economic forces on the projections of retirement benefits payable from the plan and in the discounting of those benefits to present value.

These assumptions are based, at their core, on the assumed level of price inflation. Each economic assumption is then developed from expected premiums (real rates) over price inflation. Since price inflation and real rates are relatively volatile and are subject to a number of influences not based on recent history, these assumptions are less reliably based on recent past experience than are the demographic assumptions. In order to assess real rates of assumed investment return above price inflation, we used the capital market assumptions for future experience from several prominent investment consulting firms, including ERFC's current consultant (GRS is not a registered investment consultant and does not provide investment advice). All assumptions are estimates of future experience.

The key economic assumptions are:

1. **Assumed Rate of Inflation** - The rate of price inflation (as measured by the Consumer Price Index for all Urban consumers) which underlies the remainder of the economic assumptions.

2. **Assumed Rate of Investment Return** - The rate at which projected future benefits under the system are reduced to present value.

3. **Assumed Rate of Post-Retirement Cost of Living Increases** - The rate at which individual benefits are projected to increase after retirement.

4. **Assumed Rate of Payroll Growth** - The rate of growth of the entire payroll, given a constant active member population. This reflects inflationary and other macroeconomic forces on increases in pay for individual members.

Actuarial Standards of Practice consider the Merit and Longevity portion of the pay scale also to be an economic assumption. We treat it as a demographic assumption in this report because it involves tabulation of individual member data.

Price Inflation

By "inflation," we mean price inflation, as measured by the Consumer Price Index (CPI). The inflation assumption underlies all of the other economic assumptions we employ. It not only impacts investment return, but also salary increase rates, and the payroll growth assumption. The ERFC valuation does not require a specific price inflation assumption, but an assumption on the order of 3% would be consistent with the present economic assumptions.

Price Inflation (continued)

The table below shows the average inflation over various periods.

Fiscal Year	Annual Increase in CPI-U
2009-10	1.05%
2010-11	3.56%
2011-12	1.66%
2012-13	1.75%
2013-14	2.07%
3-Year Average	1.83%
5-Year Average	2.02%
10-Year Average	2.31%
20-Year Average	2.41%
25-Year Average	2.64%
30-Year Average	2.81%
40-Year Average	4.03%
50-Year Average	2.71%

The graph below shows the average inflation over 5-year periods over the last 50 years:

Average Annual Inflation
CPI-U Five Fiscal Year Averages

■ Five-year average increase

Period	Five-year average increase
1965 - 1969	3.38%
1970 - 1974	6.01%
1975 - 1979	8.09%
1980 - 1984	7.48%
1985 - 1989	3.66%
1990 - 1994	3.59%
1995 - 1999	2.35%
2000 - 2004	2.68%
2005 - 2009	2.60%
2010 - 2014	2.02%
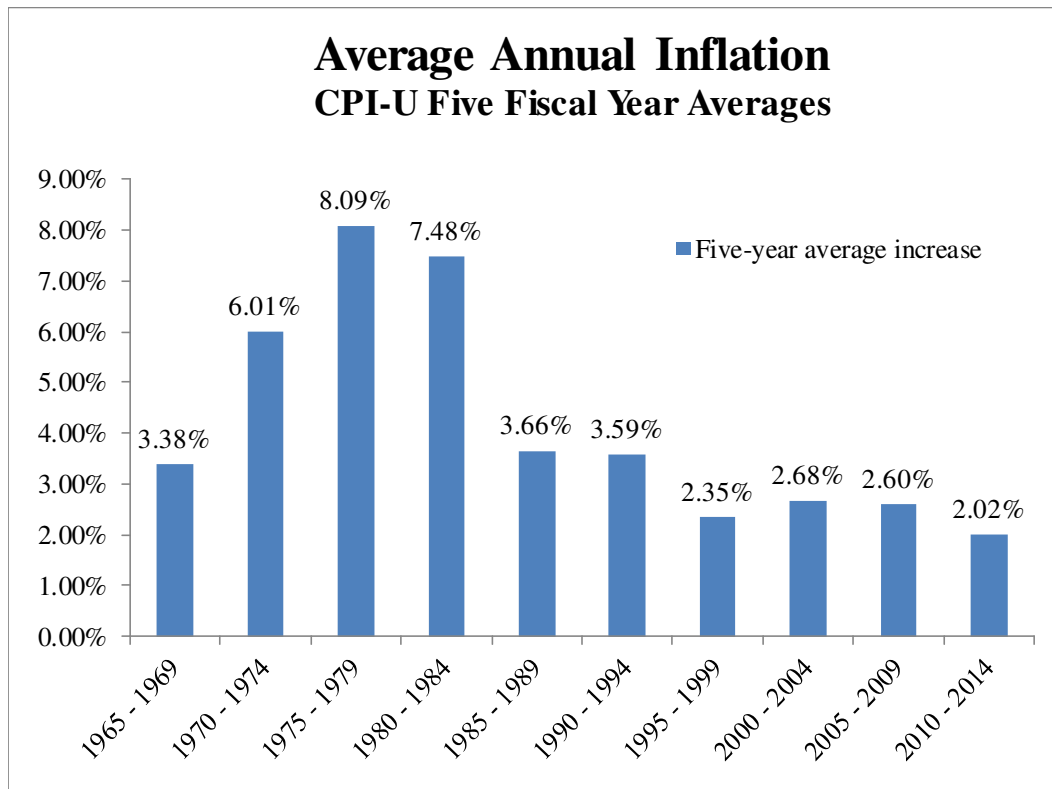
We reviewed the forward-looking inflation assumptions used by eight independent investment consulting firms with longer-term time horizons. The samples from these firms ranged from 2.11% to 2.75%, with an average of 2.33%. The 2015 Social Security Trustees Report Long-range intermediate inflation assumption is 2.7%. The high cost assumption is 2% and the low cost assumption is 3.4%. Thus, the expert estimates of inflation vary widely, but would justify a figure below 3%. **Based upon this data, we are recommending that the underlying inflation assumption for ERFC purposes be 2.75%.** It is important to understand that this is a long-term assumption. Most experts do not expect inflation to approach that rate in the near term.

Wage Growth Assumptions

Historically, real wage growth (i.e., the amount by which wage growth has exceeded price inflation) has been in the range of 0.5% to 1.1%. The 2015 Social Security Trustees Report provides real wage growth expectations ranging from 0.55% (high cost assumption) to 1.80% (low cost assumption). **We are suggesting that the Board consider alternate choices of 0.5% and 1.0% for real wage growth, which, when combined with the 2.75% price inflation, translate into 3.25% and 3.75% wage growth expectations. Please see page 28 for a complete discussion.**

Investment Return

Actuaries are required to comply with Actuarial Standards of Practice in setting economic assumptions for retirement plans, including the assumed investment return rate.

According to ASOPs applicable to valuations with a measurement date on or after September 30, 2014, each economic assumption selected or recommended by the actuary should be reasonable. For this purpose, an assumption is reasonable if it has the following characteristics:

- It is appropriate for the purpose of the measurement;
- It reflects the actuary's professional judgment;
- It takes into account historical and current economic data that is relevant as of the measurement date;
- It reflects the actuary's estimate of future experience, the actuary's observation of the estimates inherent in market data, or a combination thereof; and
- It has no significant bias (i.e., it is not significantly optimistic or pessimistic).

Also, the actuary should recognize the uncertain nature of the items for which assumptions are selected and, as a result, may consider several different assumptions reasonable for a given measurement. The actuary should also recognize that different actuaries will apply different professional judgment and may choose different reasonable assumptions. As a result, a range of reasonable assumptions may develop both for an individual actuary and across actuarial practice.

Asset Allocation

The allocation of assets within the universe of investment options will significantly impact the overall performance of plan assets. Therefore, it is meaningful to identify the range of expected returns based on the fund's targeted allocation of investments and an overall set of capital market assumptions.

Below is a table with the Systems' long-term policy asset allocation, as provided by the ERFC Executive Director.

Asset Class	Long-Term Policy Asset Allocation as of June 2015
U.S. Large-Cap Stocks	13.0%
U.S. Small-Cap Stocks	5.5%
International Stocks	12.0%
Emerging Market Stocks	5.0%
Equity Real Estate	7.5%
Private Equity	5.0%
Broad Fixed Income	29.0%
Global Asset Allocation	10.0%
Better Beta	5.0%
Absolute Return	8.0%
Total	**100.0%**

Estimate of Future Experience

Because GRS is a benefits consulting firm and does not provide investment advice, we reviewed capital market assumptions developed and published by large independent investment consulting firms. The investment consulting firms are: PCA, Towers Watson, BNY Mellon, JP Morgan, NEPC (ERFC's current consultant), RV Kuhns, Mercer, and HEK.

These investment consulting firms periodically issue reports that describe their capital market assumptions, that is, their estimates of expected returns, volatility, and correlations. While these assumptions are developed based upon historical analysis, many of these firms also incorporate forward-looking adjustments to better reflect near-term expectations. The estimates for core investments (i.e., fixed income, equities, and real estate) are generally based on anticipated returns produced by passive index funds.

Given the plan's long-term policy target asset allocation and the capital market assumptions from the investment consultants, the development of the average nominal return, net of investment expenses, is provided in the table below:

Investment Consultant	Investment Consultant Expected Nominal Return	Investment Consultant Inflation Assumption	Expected Real Return (2)–(3)	Actuary Inflation Assumption	Expected Nominal Return (4)+(5)	Standard Deviation of Expected Return (1-Year)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	5.17%	2.12%	3.04%	2.75%	5.79%	8.90%
2	6.17%	2.50%	3.67%	2.75%	6.42%	8.90%
3	6.38%	2.50%	3.88%	2.75%	6.63%	10.50%
4	6.20%	2.20%	4.00%	2.75%	6.75%	9.60%
5	6.65%	2.26%	4.39%	2.75%	7.14%	9.30%
6	6.76%	2.11%	4.65%	2.75%	7.40%	9.70%
7	7.83%	2.75%	5.08%	2.75%	7.83%	10.80%
8	7.51%	2.20%	5.31%	2.75%	8.06%	10.10%
Average	**6.58%**	**2.33%**	**4.25%**	**2.75%**	**7.00%**	**9.73%**

We have determined for each firm the expected nominal return rate, then subtracted that firm's expected inflation to arrive at their expected real return in column (4). Then we have added back our suggested 2.75% inflation assumption to get a net nominal return shown in column (6). Because the asset classes that the investment firms use are not identical to those contained in the ERFC's target asset allocation, there is a certain amount of subjectivity involved in developing the figures in the chart. The figures should be considered as approximate guides to judgment, rather than as exact scientific numbers. The view of the Systems' own investment consultant should be awarded considerable weight in the analysis. As the table shows, the average expected one-year return (net of expenses) of the eight firms is 7.00%. That figure is 0.50% lower than the current assumption of 7.50%. **We recommend that the investment return assumption be net of investment expenses only (and that administrative expenses be funded through an addition to the normal cost contribution).** The investment consultant nominal returns shown are already net of investment expenses.

Estimate of Future Experience (continued)

In a volatile investment environment, gains and losses do not always offset each other. For example if an investor enters Period 1 with a $1 Million portfolio and experiences a 50% loss, the investor has $500,000 at the end of Period 1. If, then in Period 2, the investor experiences a 50% gain, the investor has $750,000 at the end of Period 2, and has still not recovered from the loss. The same thing would happen if the gains and losses occurred in the reverse order. This effect is called "volatility drag." Therefore, it is important to consider both the expected return and the anticipated volatility of the investment portfolio in order to estimate the long-term net return that could be expected to be produced by the investment portfolio. The following table provides the 40th, 50th, and 60th percentiles of the 20-year geometric average of the expected nominal return, net of investment expenses, as well as the probability of exceeding a 7.00%, 7.25%, and 7.50% assumption.

Investment Consultant	Distribution of 20-Year Average Geometric Net Nominal Return			Probability of Exceeding		
	40th	50th	60th	7.50%	7.25%	7.00%
(1)	(2)	(3)	(4)	(5)	(5)	(5)
1	4.91%	5.41%	5.91%	14.8%	17.9%	21.3%
2	5.55%	6.05%	6.55%	23.2%	27.2%	31.5%
3	5.52%	6.10%	6.69%	27.5%	31.2%	35.1%
4	5.77%	6.31%	6.85%	29.0%	33.1%	37.4%
5	6.20%	6.73%	7.25%	35.5%	40.0%	44.8%
6	6.41%	6.95%	7.50%	40.1%	44.6%	49.2%
7	6.67%	7.27%	7.89%	46.3%	50.4%	54.5%
8	7.01%	7.58%	8.15%	51.4%	55.8%	60.2%
Average	**6.00%**	**6.55%**	**7.10%**	**33.5%**	**37.5%**	**41.7%**

As the analysis shows, there is a 50% likelihood that the 20-year average net nominal return will be at least 6.55%, a 41.7% likelihood that the plan will produce an average return that exceeds 7.00%, a 37.5% chance of exceeding 7.25%, and only a 33.5% chance of exceeding 7.50% (the current assumption) over the next 20 years. It should be noted that firms 1-4 have shorter time horizons than firms 5-8 and that, therefore, the returns from firms 5-8 may be more relevant to long-term pension funding.

Recommendation

Based on our analysis of the expected investment return, the long-term policy asset allocation, and considering relevant ASOPs, we recommend that the Board lower the long-term investment return assumption (net of investment expenses) of 7.50%. We have produced results based on 7.25% and 7.00%. Lower assumptions would also be reasonable and would increase the likelihood of meeting or exceeding the assumption.

Adjustment for unused sick leave: Currently, liabilities for Normal and Early retirement benefits are increased by 3.25% for ERFC members to account for the inclusion of unused sick leave in the calculation of Final Average Compensation. As part of the experience study, we reviewed increases in benefits related to the recognition of unused sick leave that may be granted at retirement. In accordance with the experience in this area, we have maintained this estimate.

Forfeitures: We adjusted the rates of forfeiture following vested separation to assume an across-the-board rate of 10% (as opposed to a graded schedule).

Option Factors: We performed an analysis of the current option factors outlined in the Plan Document versus actuarial equivalent option factors (on the basis of the proposed mortality assumption outlined in this study). We have concluded that there is currently a "negative subsidy" of 1% on average in the Plan Document option factors. Therefore, we have incorporated a downward adjustment of 1% to the liabilities for Normal and Early retirement benefits.

Unisex Assumption Used in Calculating Actuarial Equivalent Benefits: Based on the current male/female demographics in the active population (approximately 20%), and based on our analysis of Option D elections during the experience period (20%-25%), we recommend that the current 20%/80% mix be maintained.

SECTION B
SUMMARY OF THE VALUATION RESULTS

The table below describes hypothetical valuation results at December 31, 2014 with new and old decrement assumptions with indicated spreads.

	Percent of Active Member Payroll			
	Present Demographic	**Revised Demographic Assumptions and Economic Assumptions**		
Interest Rate Assumption **Wage Growth Assumption**	**7.50%** **3.75%**	**7.50%** **3.75%**	**7.25%** **3.25%**	**7.00%** **3.25%**
Total Contribution	8.59%	8.61%	8.97%	9.70%
Member Contributions	3.00%	3.00%	3.00%	3.00%
Net Employer Contribution	5.59%	5.61%	5.97%	6.70%
Contingency Contribution	0.01%	0.00%	0.00%	0.00%
Funding Policy Contribution	**5.60%**	**5.61%**	**5.97%**	**6.70%**
Change from Present		*0.01%*	*0.37%*	*1.10%*

Contributions for fiscal years 2016 and 2017 have already been determined based on the December 31, 2013 valuation. Contribution rates for fiscal years 2018 and 2019 will be based on the December 31, 2015 valuation. The December 31, 2015 valuation will be the first opportunity to see the effect of the new assumptions on computed employer contribution rates. Experience gains or losses incurred during 2015 will also affect FY 2018 and FY 2019 contribution rates.

We recommend that the Board:

- **Adopt the demographic assumptions presented in this report**
- **Adopt either the 7.25%/3.25% or the 7%/3.25% economic combinations illustrated above.**

We would not be opposed to lowering the investment return assumption to a value below 7%. If the Board wishes to do so, please let us know and we will review the effect on contributions.

SECTION C

WITHDRAWAL EXPERIENCE

SERVICE-BASED WITHDRAWAL EXPERIENCE
MALES

There were 1,015 withdrawals and 16,681 years of exposure included in the male service-based withdrawal investigation. Withdrawals are separations from active member status for a reason other than disability, death, or retirement.

Years of Service	Withdrawals	Life Years Exposure	Actual Rates Weighted by		Sample Rates		Expected Withdrawals	
			Population	Liability	Present	Proposed	Present	Proposed
0-1	119	902	0.1319	0.1215	0.1600	0.1300	144	117
1-2	184	1,446	0.1272	0.1135	0.1300	0.1200	188	174
2-3	142	1,273	0.1115	0.1005	0.1300	0.1100	165	140
3-4	106	1,144	0.0927	0.0784	N/A	0.0900	N/A	103
4-5	73	1,075	0.0679	0.0577	N/A	0.0700	N/A	75
5-6	64	1,095	0.0584	0.0568	N/A	0.0600	N/A	66
6-7	59	1,128	0.0523	0.0507	N/A	0.0500	N/A	56
7-8	47	1,055	0.0445	0.0405	N/A	0.0400	N/A	42
8-9	48	1,005	0.0478	0.0446	N/A	0.0400	N/A	40
9-10	39	926	0.0421	0.0396	N/A	0.0400	N/A	37
10-11	35	869	0.0403	0.0378	N/A	0.0400	N/A	35
11-12	20	770	0.0260	0.0215	N/A	0.0300	N/A	23
12-13	22	687	0.0320	0.0319	N/A	0.0300	N/A	21
13-14	17	572	0.0297	0.0290	N/A	0.0300	N/A	17
14-15	8	473	0.0169	0.0150	N/A	0.0200	N/A	9
15-16	6	377	0.0159	0.0156	N/A	0.0200	N/A	8
16-17	3	352	0.0085	0.0116	N/A	0.0100	N/A	4
17-18	4	324	0.0123	0.0086	N/A	0.0100	N/A	3
18-19	7	298	0.0235	0.0254	N/A	0.0100	N/A	3
19-20	2	241	0.0083	0.0069	N/A	0.0100	N/A	2
20-21	-	198	0.0000	0.0000	N/A	0.0100	N/A	2
21-22	4	160	0.0250	0.0228	N/A	0.0100	N/A	2
22-23	3	132	0.0227	0.0173	N/A	0.0100	N/A	1
23-24	3	124	0.0242	0.0299	N/A	0.0100	N/A	1
24-25	-	55	0.0000	0.0000	N/A	0.0100	N/A	1
			0.0608	0.0628	N/A	0.0589	498	
					(for service >3 years):		527	
Totals	1,015	16,681				Total:	1,025	982

SERVICE-BASED WITHDRAWAL EXPERIENCE
MALES (CONCLUDED)

Years of Service

— Actual Experience   — Proposed Assumptions
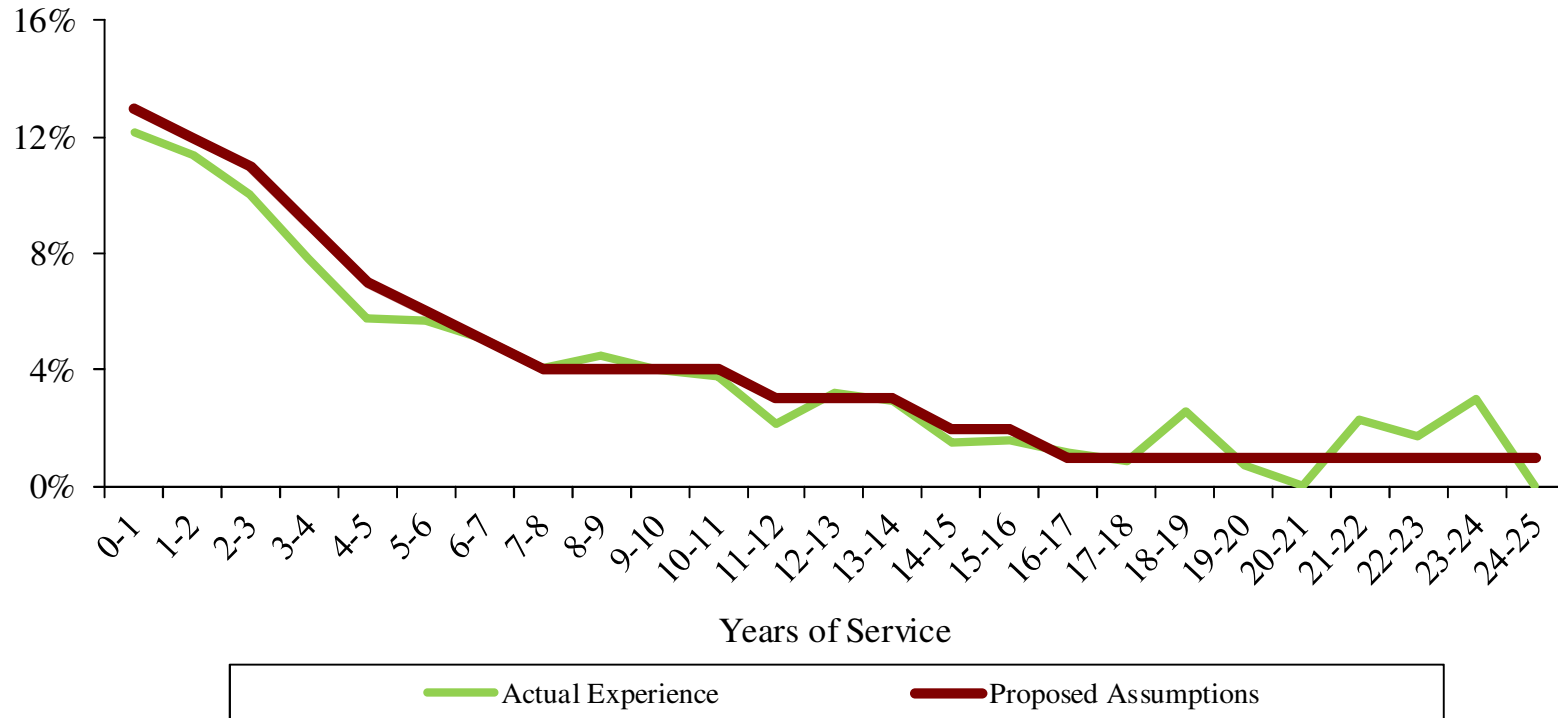
SERVICE-BASED WITHDRAWAL EXPERIENCE
FEMALES

There were 5,779 withdrawals and 65,773 years of exposure included in the female service-based withdrawal investigation. Withdrawals are separations from active member status for a reason other than disability, death, or retirement.

Years of Service	Withdrawals	Life Years Exposure	Actual Rates Weighted by		Sample Rates		Expected Withdrawals	
			Population	Liability	Present	Proposed	Present	Proposed
0-1	602	4,425	0.1360	0.1309	0.1600	0.1500	708	664
1-2	964	7,281	0.1324	0.1291	0.1400	0.1400	1,019	1,019
2-3	828	6,463	0.1281	0.1234	0.1400	0.1300	905	840
3-4	606	5,678	0.1067	0.1053	N/A	0.1100	N/A	625
4-5	485	5,141	0.0943	0.0892	N/A	0.0900	N/A	463
5-6	470	4,964	0.0947	0.0884	N/A	0.0900	N/A	447
6-7	452	4,704	0.0961	0.0928	N/A	0.0900	N/A	423
7-8	366	4,222	0.0867	0.0859	N/A	0.0900	N/A	380
8-9	240	3,783	0.0634	0.0614	N/A	0.0600	N/A	227
9-10	191	3,347	0.0571	0.0546	N/A	0.0500	N/A	167
10-11	159	2,899	0.0548	0.0506	N/A	0.0500	N/A	145
11-12	114	2,493	0.0457	0.0419	N/A	0.0400	N/A	100
12-13	97	2,073	0.0468	0.0437	N/A	0.0400	N/A	83
13-14	58	1,608	0.0361	0.0314	N/A	0.0300	N/A	48
14-15	36	1,215	0.0296	0.0249	N/A	0.0300	N/A	36
15-16	25	977	0.0256	0.0193	N/A	0.0300	N/A	29
16-17	23	817	0.0282	0.0227	N/A	0.0300	N/A	25
17-18	19	688	0.0276	0.0240	N/A	0.0200	N/A	14
18-19	11	580	0.0190	0.0138	N/A	0.0200	N/A	12
19-20	12	542	0.0221	0.0188	N/A	0.0200	N/A	11
20-21	6	516	0.0116	0.0071	N/A	0.0200	N/A	10
21-22	5	451	0.0111	0.0049	N/A	0.0200	N/A	9
22-23	4	405	0.0099	0.0076	N/A	0.0200	N/A	8
23-24	4	361	0.0111	0.0078	N/A	0.0200	N/A	7
24-25	2	140	0.0143	0.0089	N/A	0.0200	N/A	3
			0.0879	0.0628	N/A	0.0881	2,632	
					(for service >3 years):		2,805	
Totals	5,779	65,773				Total:	5,437	5,795
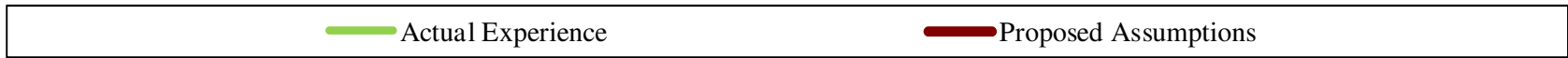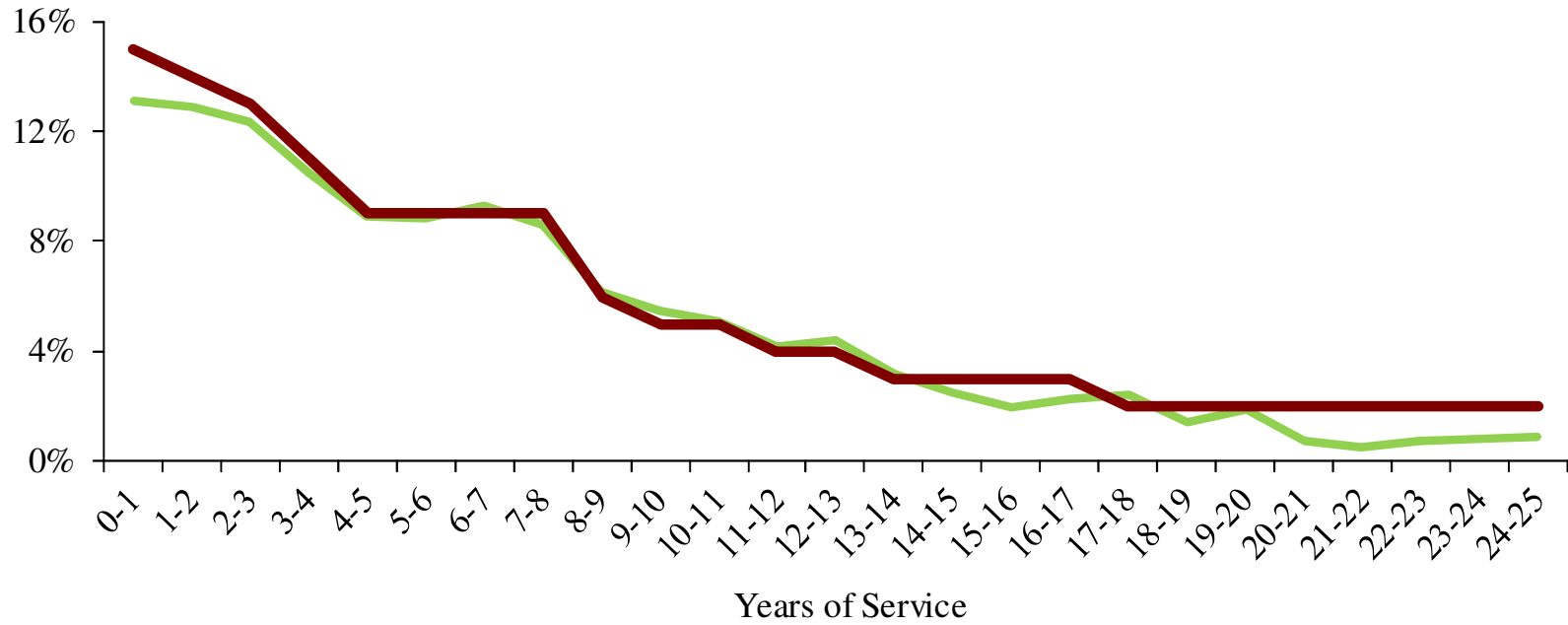
SECTION D
DISABILITY EXPERIENCE

DISABILITY EXPERIENCE
MALES

There were 0 male disability benefit claims reported for the 5-year period.

Age	Disabilities	Life Years Exposure	Crude Rates	Sample Rates		Expected Disabilities	
				Present	Proposed	Present	Proposed
20-24	-	4	0.0000	0.0003	0.0001	0	0
25-29	-	338	0.0000	0.0004	0.0002	0	0
30-34	-	1,831	0.0000	0.0005	0.0002	1	0
35-39	-	2,232	0.0000	0.0007	0.0003	2	1
40-44	-	2,617	0.0000	0.0010	0.0005	3	1
45-49	-	2,154	0.0000	0.0016	0.0008	3	2
50-54	-	1,733	0.0000	0.0026	0.0013	5	2
55-59	-	575	0.0000	0.0046	0.0023	3	1
60+	-	-	N\A	0.0066	0.0033	-	-
Totals	-	11,484	0.0000	0.0014	0.0007	16	8

RATES OF DISABLED MALES
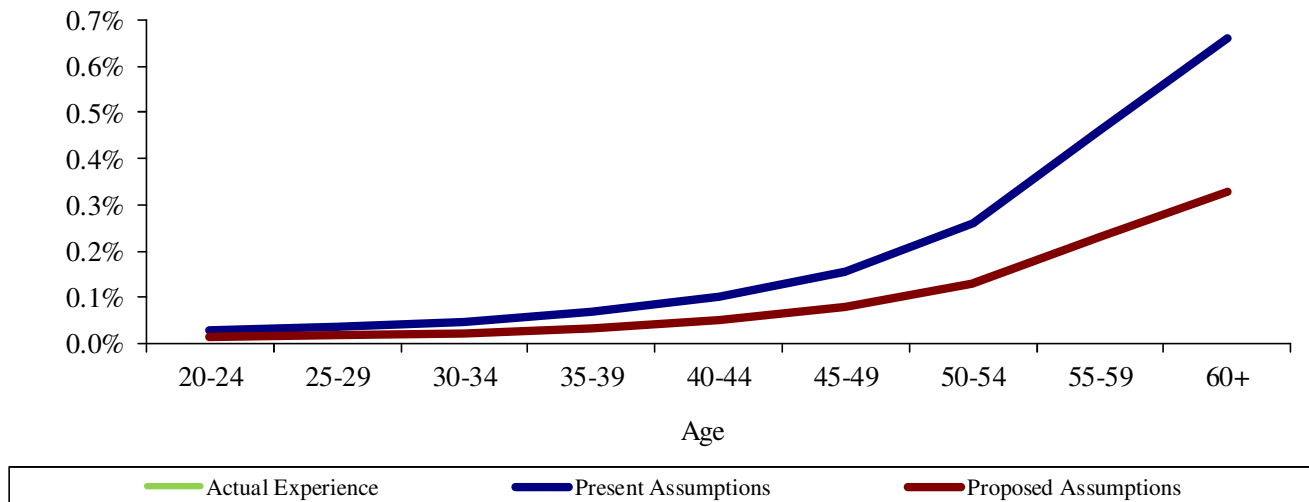
DISABILITY EXPERIENCE
FEMALES

There were 5 female disability benefit claims reported for the 5-year period.

Age	Disabilities	Life Years Exposure	Crude Rates	Sample Rates Present	Sample Rates Proposed	Expected Disabilities Present	Expected Disabilities Proposed
20-24	-	4	0.0000	0.0001	0.0001	0	0
25-29	-	2,158	0.0000	0.0002	0.0001	0	0
30-34	-	7,271	0.0000	0.0004	0.0002	3	1
35-39	-	6,106	0.0000	0.0006	0.0003	4	2
40-44	-	6,530	0.0000	0.0009	0.0004	6	3
45-49	3	6,523	0.0005	0.0014	0.0007	9	4
50-54	1	7,941	0.0001	0.0022	0.0011	18	9
55-59	-	3,335	0.0000	0.0037	0.0019	12	6
60+	1	11	0.0909	0.0039	0.0020	0	0
Totals	5	39,879	0.0001	0.0013	0.0007	52	26

RATES OF DISABLED FEMALES
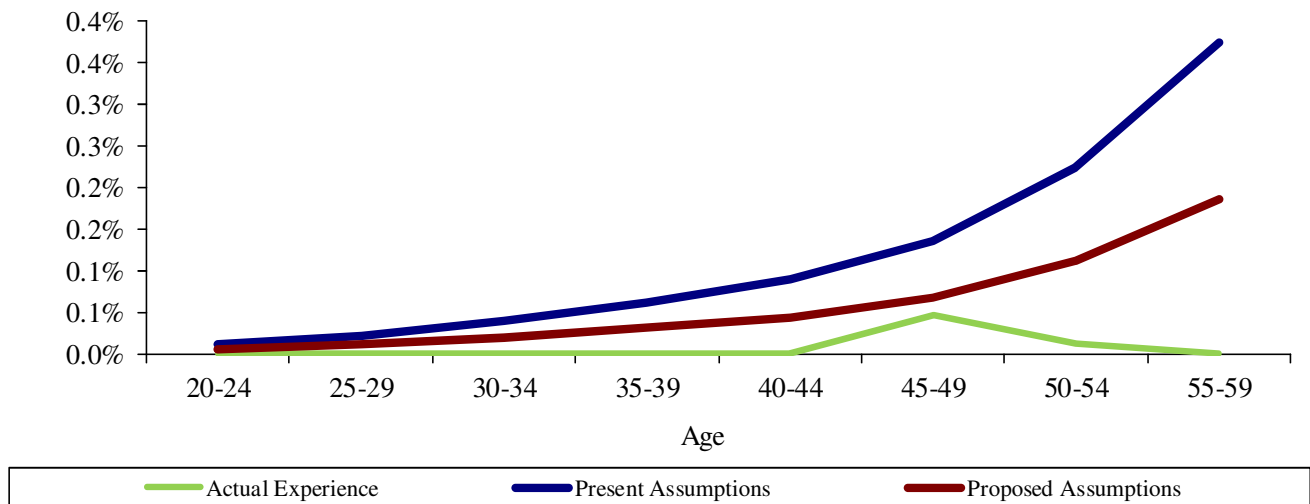
SECTION E
RETIREMENT EXPERIENCE

ERFC AGE & SERVICE
NORMAL RETIREMENT EXPERIENCE

There were 1,547 age and service unreduced retirements and 5,502 life years of exposure (exposure includes active members eligible for unreduced retirement) in the retirement investigation. Although males and females were studied separately, the proposed rates are applied to all ERFC members. Data for males and females are shown on the following page.

Age	Retirements	Life Years Exposure	Actual Rates Weighted by Population	Actual Rates Weighted by Liability	Sample Rates Present	Sample Rates Proposed	Expected Retirements Present	Expected Retirements Proposed
55	147	420	0.3500	0.3515	0.4500	0.3500	189	147
56	140	368	0.3804	0.3943	0.3500	0.3500	129	129
57	76	310	0.2452	0.2373	0.2500	0.2500	78	78
58	73	297	0.2458	0.2487	0.2500	0.2500	74	74
59	66	289	0.2284	0.2304	0.2500	0.2500	72	72
60	75	283	0.2650	0.2661	0.3000	0.2500	85	71
61	61	270	0.2259	0.2147	0.3500	0.3000	95	81
62	58	238	0.2437	0.2448	0.3500	0.3000	83	71
63	76	222	0.3423	0.3445	0.3000	0.3000	67	67
64	60	183	0.3279	0.3370	0.2500	0.3000	46	55
65	229	830	0.2759	0.3157	0.2500	0.3000	208	249
66	183	551	0.3321	0.3331	0.2500	0.3000	138	165
67	92	356	0.2584	0.2751	0.2500	0.2500	89	89
68	68	277	0.2455	0.3197	0.2500	0.2500	69	69
69	40	191	0.2094	0.2313	0.2000	0.2000	38	38
70	42	139	0.3022	0.3208	0.2000	0.2000	28	28
71	24	91	0.2637	0.2547	0.2000	0.2000	18	18
72	8	56	0.1429	0.0874	0.2000	0.2000	11	11
73	4	43	0.0930	0.1285	0.3000	0.3000	13	13
74	7	30	0.2333	0.3149	0.3000	0.3000	9	9
75 & Over	18	58	0.3103	0.2865	1.0000	1.0000	58	58
Total	1,547	5,502	0.2812	0.2959	0.2900	0.2894	1,596	1,592

RATES OF RETIREMENT

Legend: Actual Experience | Present Assumptions | Proposed Assumptions

ERFC AGE & SERVICE
NORMAL RETIREMENT EXPERIENCE (CONCLUDED)

Data for males and females are shown below:

	MALES				FEMALES			
		Life Years	Actual Rates Weighted by			Life Years	Actual Rates Weighted by	
Age	Retirements	Exposure	Population	Liability	Retirements	Exposure	Population	Liability
55	36	112	0.3214	0.3365	111	308	0.3604	0.3569
56	42	100	0.4200	0.4304	98	268	0.3657	0.3809
57	20	77	0.2597	0.2522	56	233	0.2403	0.2321
58	13	64	0.2031	0.2109	60	233	0.2575	0.2593
59	11	55	0.2000	0.1917	55	234	0.2350	0.2396
60	16	52	0.3077	0.3104	59	231	0.2554	0.2556
61	8	38	0.2105	0.1937	53	232	0.2284	0.2183
62	7	30	0.2333	0.2248	51	208	0.2452	0.2479
63	9	28	0.3214	0.3176	67	194	0.3454	0.3487
64	7	22	0.3182	0.3246	53	161	0.3292	0.3388
65	25	104	0.2404	0.2854	204	726	0.2810	0.3195
66	17	68	0.2500	0.2433	166	483	0.3437	0.3426
67	13	53	0.2453	0.2954	79	303	0.2607	0.2725
68	9	51	0.1765	0.1786	59	226	0.2611	0.3439
69	5	38	0.1316	0.1889	35	153	0.2288	0.2404
70	8	26	0.3077	0.3471	34	113	0.3009	0.3157
71	4	18	0.2222	0.2321	20	73	0.2740	0.2592
72	1	10	0.1000	0.0410	7	46	0.1522	0.0947
73	-	6	0.0000	0.0000	4	37	0.1081	0.1428
74	3	5	0.6000	0.4165	4	25	0.1600	0.2973
75 & Over	6	14	0.4286	0.5943	12	44	0.2727	0.2528
Total	260	971	0.2678	0.2986	1,287	4,531	0.2840	0.2953

ERFC AGE & SERVICE
REDUCED SERVICE RETIREMENT EXPERIENCE

There were 805 reduced service retirements and 12,787 life years of exposure (exposure includes active members eligible for reduced retirement) in the male retirement investigation. Although males and females were studied separately, the proposed rates are applied to all ERFC members. Data for males and females are shown on the following page.

Age	Retirements	Life Years Exposure	Actual Rates Weighted by Population	Actual Rates Weighted by Liability	Sample Rates Present	Sample Rates Proposed	Expected Retirements Present	Expected Retirements Proposed
45	-	8	0.0000	0.0000	0.0200	0.0200	0	0
46	1	15	0.0667	0.0679	0.0200	0.0200	0	0
47	-	40	0.0000	0.0000	0.0200	0.0200	1	1
48	2	108	0.0185	0.0242	0.0200	0.0200	2	2
49	1	165	0.0061	0.0088	0.0200	0.0200	3	3
50	7	212	0.0330	0.0309	0.0200	0.0200	4	4
51	7	239	0.0293	0.0255	0.0300	0.0300	7	7
52	13	277	0.0469	0.0510	0.0600	0.0600	17	17
53	18	296	0.0608	0.0627	0.0800	0.0700	24	21
54	30	345	0.0870	0.0897	0.0800	0.0800	28	28
55	28	1,116	0.0251	0.0240	0.0900	0.0600	100	67
56	37	1,183	0.0313	0.0252	0.0400	0.0400	47	47
57	42	1,179	0.0356	0.0317	0.0400	0.0400	47	47
58	53	1,203	0.0441	0.0468	0.0400	0.0400	48	48
59	56	1,204	0.0465	0.0420	0.0400	0.0400	48	48
60	78	1,182	0.0660	0.0604	0.0800	0.0700	95	83
61	82	1,102	0.0744	0.0800	0.0900	0.0800	99	88
62	117	1,088	0.1075	0.1126	0.1500	0.1300	163	141
63	126	983	0.1282	0.1284	0.1800	0.1300	177	128
64	107	842	0.1271	0.1372	0.1800	0.1300	152	109
Totals	805	12,787	0.0630	0.0538	0.0831	0.0696	1,063	890

RATES OF REDUCED RETIREMENT
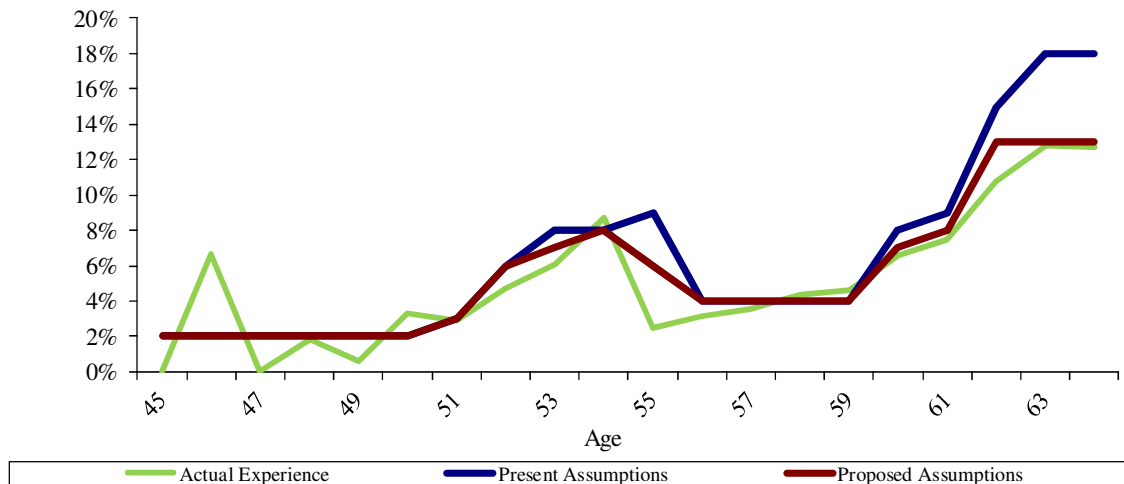
ERFC AGE & SERVICE
EARLY RETIREMENT EXPERIENCE

Data for males and females are shown below:

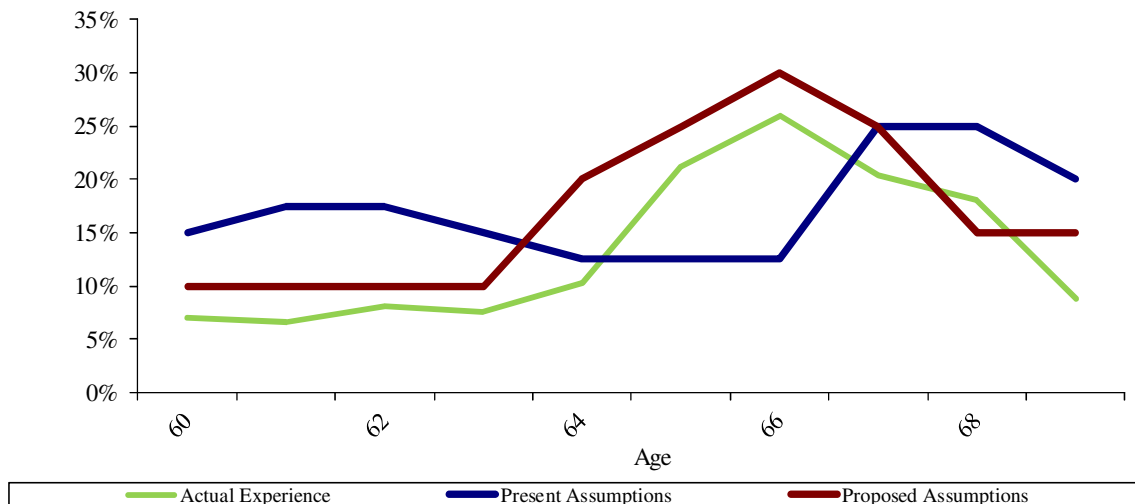|	MALES				FEMALES			
		Life Years	Actual Rates Weighted by			Life Years	Actual Rates Weighted by	
Age	Retirements	Exposure	Population	Liability	Retirements	Exposure	Population	Liability
45	-	2	0.0000	0.0000	-	6	0.0000	0.0000
46	-	3	0.0000	0.0000	1	12	0.0833	0.0834
47	-	8	0.0000	0.0000	-	32	0.0000	0.0000
48	1	22	0.0455	0.0504	1	86	0.0116	0.0176
49	-	41	0.0000	0.0000	1	124	0.0081	0.0118
50	3	58	0.0517	0.0408	4	154	0.0260	0.0272
51	5	69	0.0725	0.0621	2	170	0.0118	0.0105
52	3	73	0.0411	0.0439	10	204	0.0490	0.0537
53	5	78	0.0641	0.0678	13	218	0.0596	0.0608
54	14	100	0.1400	0.1477	16	245	0.0653	0.0653
55	3	156	0.0192	0.0412	25	960	0.0260	0.0206
56	3	161	0.0186	0.0199	34	1,022	0.0333	0.0262
57	5	143	0.0350	0.0657	37	1,036	0.0357	0.0262
58	8	139	0.0576	0.0552	45	1,064	0.0423	0.0456
59	3	140	0.0214	0.0153	53	1,064	0.0498	0.0460
60	11	135	0.0815	0.0859	67	1,047	0.0640	0.0568
61	9	134	0.0672	0.0581	73	968	0.0754	0.0833
62	16	129	0.1240	0.1091	101	959	0.1053	0.1131
63	17	103	0.1650	0.1592	109	880	0.1239	0.1249
64	9	97	0.0928	0.0761	98	745	0.1315	0.1447
Total	115	1,791	0.0642	0.0665	690	10,996	0.0628	0.0507

ERFC 2001 AGE & SERVICE
NORMAL RETIREMENT EXPERIENCE

There were 378 age and service unreduced retirements and 3,424 life years of exposure (exposure includes active members eligible for unreduced retirement) in the male retirement investigation. Although males and females were studied separately, the proposed rates are applied to all ERFC 2001 members. Data for males and females are shown on the following page.

Rates for the 30 & out eligibility provision were adjusted in accordance with the proposed rates. Since this plan was implemented in 2001, there has not yet been enough experience (over 30 years' worth) to develop separate service-based retirement rates.

Age	Retirements	Life Years Exposure	Actual Rates Weighted by Population	Liability	Sample Rates Present	Proposed	Expected Retirements Present	Proposed
60	46	655	0.0702	0.0817	0.1500	0.1000	98	66
61	38	575	0.0661	0.0723	0.1750	0.1000	101	58
62	40	492	0.0813	0.0938	0.1750	0.1000	86	49
63	33	439	0.0752	0.0728	0.1500	0.1000	66	44
64	39	380	0.1026	0.1152	0.1250	0.2000	48	76
65	64	302	0.2119	0.2358	0.1250	0.2500	38	76
66	49	189	0.2593	0.2936	0.1250	0.3000	24	57
67	25	123	0.2033	0.2305	0.2500	0.2500	31	31
68	15	83	0.1807	0.1940	0.2500	0.1500	21	12
69	5	57	0.0877	0.1149	0.2000	0.1500	11	9
70	5	44	0.1136	0.0914	0.2000	0.1500	9	7
71	6	31	0.1935	0.2118	0.2000	0.1500	6	5
72	4	19	0.2105	0.1951	0.2000	0.1500	4	3
73	1	10	0.1000	0.2057	0.3000	0.1500	3	2
74	1	6	0.1667	0.0992	0.3000	0.1500	2	1
75 & Over	7	19	0.3684	0.2958	1.0000	1.0000	19	19
Total	378	3,424	0.1104	0.1192	0.1651	0.1494	565	512

RATES OF RETIREMENT

ERFC 2001 AGE & SERVICE
NORMAL RETIREMENT EXPERIENCE (CONCLUDED)

Data for males and females are shown below:

			MALES					FEMALES	
		Life Years	Actual Rates Weighted by				Life Years	Actual Rates Weighted by	
Age	Retirements	Exposure	Population	Liability	Retirements	Exposure	Population	Liability
60	9	112	0.0804	0.0930	37	543	0.0681	0.0795
61	2	106	0.0189	0.0159	36	469	0.0768	0.0850
62	7	102	0.0686	0.0528	33	390	0.0846	0.1045
63	5	98	0.0510	0.0609	28	341	0.0821	0.0762
64	12	96	0.1250	0.1783	27	284	0.0951	0.0948
65	13	75	0.1733	0.2066	51	227	0.2247	0.2446
66	16	53	0.3019	0.2917	33	136	0.2426	0.2943
67	10	36	0.2778	0.3419	15	87	0.1724	0.1876
68	2	24	0.0833	0.1097	13	59	0.2203	0.2261
69	1	17	0.0588	0.0602	4	40	0.1000	0.1361
70	1	17	0.0588	0.0329	4	27	0.1481	0.1234
71	2	16	0.1250	0.1345	4	15	0.2667	0.2886
72	-	11	0.0000	0.0000	4	8	0.5000	0.5327
73	1	9	0.1111	0.2162	-	1	0.0000	0.0000
74	1	5	0.2000	0.1080	-	1	0.0000	0.0000
75 & Over	5	16	0.3125	0.1167	2	3	0.6667	0.5954
Total	87	793	0.1097	0.2143	291	2,631	0.1106	0.1196

SECTION F
SALARY INCREASES

SERVICE-BASED MERIT & LONGEVITY
PAY INCREASE ASSUMPTIONS

Service Index	Number	Merit/Seniority % Increase Sample Values		
		Observed	Present	Proposed
1	4,604	3.72 %	5.30 %	4.30 %
2	7,576	2.55 %	3.80 %	3.00 %
3	6,761	1.69 %	3.30 %	2.30 %
4	6,107	1.45 %	3.10 %	2.10 %
5	5,849	1.18 %	2.90 %	2.00 %
6	5,896	1.15 %	2.70 %	1.90 %
7	5,750	1.28 %	2.70 %	1.80 %
8	5,352	1.27 %	2.30 %	1.70 %
9	5,042	1.20 %	2.10 %	1.60 %
10	4,758	1.14 %	1.80 %	1.40 %
11	4,469	1.16 %	1.80 %	1.40 %
12	4,181	1.18 %	1.80 %	1.40 %
13	3,776	1.38 %	1.80 %	1.40 %
14	3,333	1.38 %	1.80 %	1.40 %
15	2,759	1.34 %	1.80 %	1.40 %
16	2,294	1.14 %	1.80 %	1.30 %
17	1,980	0.71 %	1.80 %	1.20 %
18	1,740	0.95 %	1.80 %	1.00 %
19	1,532	1.06 %	1.80 %	1.00 %
20	1,444	0.77 %	1.00 %	0.90 %
21	1,358	0.58 %	1.00 %	0.80 %
22	1,254	0.57 %	1.00 %	0.70 %
23	1,146	0.65 %	1.00 %	0.60 %
24	1,104	0.46 %	1.00 %	0.50 %
25+	4,032	0.08 %	0.00 %	0.00 %
Total	94,097			

The above sample values are net of market scale adjustments which averaged approximately 2% over the experience period.

EXPERIENCE STUDY – 5-YEAR PERIOD ENDING DECEMBER 31, 2014
RETIREMENT SYSTEM AVERAGE SALARY INCREASES

A recent history of the average pay of active members is as follows:

Valuation Date	Average Pay	Annual Increase in Average Pay		NAE	% Change
		Actual*	Assumed		
12/31/2005	$ 55,040	5.4%	3.75%	$ 36,952.94	3.7%
12/31/2006	57,396	4.3%	3.75%	38,651.41	4.6%
12/31/2007	59,260	3.2%	3.75%	40,405.48	4.5%
12/31/2008	61,383	3.6%	3.75%	41,334.97	2.3%
12/31/2009	60,736	(1.1%)	3.75%	40,711.61	(1.5%)
12/31/2010	59,148	(2.6%)	3.75%	41,673.83	2.4%
12/31/2011	59,448	0.5%	3.75%	42,979.61	3.1%
12/31/2012	60,297	1.4%	3.75%	44,321.67	3.1%
12/31/2013	61,004	1.2%	3.75%	44,888.16	1.3%
12/31/2014	62,774	2.9%	3.75%	N/A	N/A
5-year average		0.7%			2.5%
10-year average		1.9%			2.6%

> * An entry in this column higher or lower than 3.75% tends to indicate that, in total, pays increased more than assumed.

The figures in the chart are affected by whether or not the covered population increases. In all likelihood, however, they were greatly affected by the "great recession".

This Exhibit shows that over the period of the experience study, average pay increases were less than the assumed 3.75% rate 5 out of 5 times, and less than the increase in national average earnings over the same period. ERFC (Legacy Plan and 2001 Plan) has averaged 1.9% per year since 2005, while National Average Earnings rose an average of 2.6% per year over the same 10-year period. The 5-year average is even less at 0.7%, although the FCPS market scale adjustment was a little less than 2.0%. Since all of the averages are below 3.75%, this chart is consistent with the idea of lowering the wage growth assumption in ERFC to something below 3.75%. We are recommending a wage inflation assumption of 3.25%.

SECTION G
SUMMARY OF NEW ASSUMPTIONS

SERVICE-BASED WITHDRAWAL

	% of Active Participants Withdrawing	
Service	**Male**	**Female**
0-1	13.0%	15.0%
1-2	12.0%	14.0%
2-3	11.0%	13.0%
3-4	9.0%	11.0%
4-5	7.0%	9.0%
5-6	6.0%	9.0%
6-7	5.0%	9.0%
7-8	4.0%	9.0%
8-9	4.0%	6.0%
9-10	4.0%	5.0%
10-11	4.0%	5.0%
11-12	3.0%	4.0%
12-13	3.0%	4.0%
13-14	3.0%	3.0%
14-15	2.0%	3.0%
15-16	2.0%	3.0%
16-17	1.0%	3.0%
17-18	1.0%	2.0%
18-19	1.0%	2.0%
19-20	1.0%	2.0%
20-21	1.0%	2.0%
21-22	1.0%	2.0%
22-23	1.0%	2.0%
23-24	1.0%	2.0%
24-25	1.0%	2.0%
Ref	1671	1672

DISABILITY RATES

Age	% of Active Participants Becoming Disabled		Age	% of Active Participants Becoming Disabled	
	Male	Female		Male	Female
Under 20	0.01%	0.01%	50	0.11%	0.09%
20	0.01%	0.01%	51	0.12%	0.10%
21	0.01%	0.01%	52	0.13%	0.11%
22	0.01%	0.01%	53	0.15%	0.12%
23	0.02%	0.01%	54	0.16%	0.14%
24	0.02%	0.01%	55	0.18%	0.15%
25	0.02%	0.01%	56	0.21%	0.17%
26	0.02%	0.01%	57	0.23%	0.19%
27	0.02%	0.01%	58	0.26%	0.20%
28	0.02%	0.01%	59	0.28%	0.21%
29	0.02%	0.01%	60	0.31%	0.22%
30	0.02%	0.02%	61	0.32%	0.22%
31	0.02%	0.02%	62	0.33%	0.20%
32	0.02%	0.02%	63	0.33%	0.20%
33	0.03%	0.02%	64	0.33%	0.20%
34	0.03%	0.02%	65	0.33%	0.20%
35	0.03%	0.03%	66	0.33%	0.20%
36	0.03%	0.03%	67	0.33%	0.20%
37	0.03%	0.03%	68	0.33%	0.20%
38	0.04%	0.03%	69	0.33%	0.20%
39	0.04%	0.04%	70	0.33%	0.20%
40	0.04%	0.04%	71	0.33%	0.20%
41	0.05%	0.04%	72	0.33%	0.20%
42	0.05%	0.04%	73	0.33%	0.20%
43	0.05%	0.05%	74	0.33%	0.20%
44	0.06%	0.05%	75	0.33%	0.20%
45	0.07%	0.06%	76	0.33%	0.20%
46	0.07%	0.06%	77	0.33%	0.20%
47	0.08%	0.07%	78	0.33%	0.20%
48	0.09%	0.07%	79	0.33%	0.20%
49	0.10%	0.08%	80	0.33%	0.20%
Ref	16 x 10%	17 x 10%		16 x 10%	17 x 10%

80% are assumed to be ordinary disability and 20% are assumed to be duty disability.

SALARY SCALE – SERVICE BASED RATES

% Merit Increases in Salaries Next Year	
Service Index	**Rate**
1	4.3%
2	3.0%
3	2.3%
4	2.1%
5	2.0%
6	1.9%
7	1.8%
8	1.7%
9	1.6%
10	1.4%
11	1.4%
12	1.4%
13	1.4%
14	1.4%
15	1.4%
16	1.3%
17	1.2%
18	1.0%
19	1.0%
20	0.9%
21	0.8%
22	0.7%
23	0.6%
24	0.5%
25	0.0%
Ref	686

ACTUARIAL ASSUMPTIONS
BASED ON 2010-2014 EXPERIENCE STUDY

RETIREMENT PATTERN

| | Hired Before 7/1/2001 | | Hired on or After 7/1/2001 | | |
| | Type of Retirement | | Age | | Service |
Age	Regular	Early	Based	Service	Based
45		2.0%			
46		2.0%			
47		2.0%			
48		2.0%			
49		2.0%			
50		2.0%			
51		3.0%			
52		6.0%			
53		7.0%			
54		8.0%			
55	35.0%	6.0%	17.5%	30	17.5%
56	35.0%	4.0%	17.5%	31	17.5%
57	25.0%	4.0%	12.5%	32	12.5%
58	25.0%	4.0%	12.5%	33	12.5%
59	25.0%	4.0%	12.5%	34	12.5%
60	25.0%	7.0%	10.0%	35	10.0%
61	30.0%	8.0%	10.0%	36	10.0%
62	30.0%	13.0%	10.0%	37	10.0%
63	30.0%	13.0%	10.0%	38	25.0%
64	30.0%	13.0%	20.0%	39	40.0%
65	30.0%		25.0%	40 & Up	100.0%
66	30.0%		30.0%		
67	25.0%		25.0%		
68	25.0%		15.0%		
69	20.0%		15.0%		
70	20.0%		15.0%		
71	20.0%		15.0%		
72	20.0%		15.0%		
73	30.0%		15.0%		
74	30.0%		15.0%		
75	100.0%		100.0%		
76	100.0%		100.0%		
77	100.0%		100.0%		
78	100.0%		100.0%		
79	100.0%		100.0%		
80	100.0%		100.0%		
Ref	2891	2893	2892		2894

ACTUARIAL ASSUMPTIONS
BASED ON 2010-2014 EXPERIENCE STUDY

RETIRED LIVES MORTALITY RATES

Age	% Dying Next Year Male	% Dying Next Year Female	Age	% Dying Next Year Male	% Dying Next Year Female
50	0.4064%	0.2768%	86	8.6712%	6.7801%
51	0.4384%	0.2905%	87	9.7038%	7.6012%
52	0.4709%	0.3057%	88	10.8591%	8.5230%
53	0.5042%	0.3225%	89	12.1499%	9.5563%
54	0.5384%	0.3412%	90	13.5908%	10.7126%
55	0.5735%	0.3622%	91	15.1322%	11.9744%
56	0.6099%	0.3858%	92	16.7422%	13.3299%
57	0.6478%	0.4128%	93	18.4030%	14.7720%
58	0.6877%	0.4436%	94	20.1074%	16.2971%
59	0.7305%	0.4789%	95	21.8559%	17.9034%
60	0.7771%	0.5191%	96	23.6535%	19.5903%
61	0.8284%	0.5646%	97	25.5059%	21.3565%
62	0.8854%	0.6156%	98	27.4170%	23.1991%
63	0.9492%	0.6723%	99	29.3848%	25.1123%
64	1.0209%	0.7352%	100	31.3988%	27.0858%
65	1.1013%	0.8048%	101	33.4365%	29.1040%
66	1.1916%	0.8821%	102	35.4599%	31.1444%
67	1.2930%	0.9679%	103	37.4524%	33.1900%
68	1.4067%	1.0633%	104	39.3982%	35.2232%
69	1.5342%	1.1692%	105	41.2831%	37.2273%
70	1.6769%	1.2868%	106	43.0946%	39.1860%
71	1.8363%	1.4171%	107	44.8227%	41.0849%
72	2.0141%	1.5614%	108	46.4592%	42.9112%
73	2.2127%	1.7210%	109	47.9987%	44.6544%
74	2.4345%	1.8977%	110	49.4376%	46.3061%
75	2.6826%	2.0938%	111	50.0000%	47.8604%
76	2.9608%	2.3118%	112	50.0000%	49.3137%
77	3.2735%	2.5554%	113	50.0000%	50.0000%
78	3.6258%	2.8288%	114	50.0000%	50.0000%
79	4.0232%	3.1366%	115	50.0000%	50.0000%
80	4.4722%	3.4844%	116	50.0000%	50.0000%
81	4.9795%	3.8783%	117	50.0000%	50.0000%
82	5.5526%	4.3246%	118	50.0000%	50.0000%
83	6.1996%	4.8305%	119	50.0000%	50.0000%
84	6.9290%	5.4032%	120	100.0000%	100.0000%
85	7.7497%	6.0504%	Ref	#1135sb0xl	#1136sb0xl

Applicable to calendar year 2014. Rates in future years are determined by the above rates and the MP-2014 projection scale.

ACTUARIAL ASSUMPTIONS
BASED ON 2010-2014 EXPERIENCE STUDY

DEATH-IN-SERVICE RATES

Age	% Dying Next Year	
	Male	Female
20	0.0244%	0.0097%
21	0.0269%	0.0097%
22	0.0293%	0.0097%
23	0.0305%	0.0100%
24	0.0310%	0.0101%
25	0.0290%	0.0104%
26	0.0277%	0.0107%
27	0.0269%	0.0112%
28	0.0266%	0.0118%
29	0.0268%	0.0124%
30	0.0271%	0.0131%
31	0.0278%	0.0139%
32	0.0286%	0.0146%
33	0.0295%	0.0155%
34	0.0305%	0.0163%
35	0.0314%	0.0172%
36	0.0322%	0.0180%
37	0.0331%	0.0191%
38	0.0342%	0.0203%
39	0.0357%	0.0219%
40	0.0377%	0.0238%
41	0.0403%	0.0260%
42	0.0435%	0.0286%
43	0.0476%	0.0317%
44	0.0526%	0.0353%
45	0.0584%	0.0394%
46	0.0652%	0.0440%
47	0.0729%	0.0490%
48	0.0815%	0.0544%
49	0.0909%	0.0601%
50	0.1012%	0.0661%
51	0.1123%	0.0724%
52	0.1243%	0.0789%
53	0.1373%	0.0857%
54	0.1516%	0.0929%
55	0.1673%	0.1004%
56	0.1847%	0.1083%
57	0.2044%	0.1168%
58	0.2267%	0.1258%
59	0.2522%	0.1357%
60	0.2813%	0.1465%
61	0.3144%	0.1585%
62	0.3520%	0.1718%
63	0.3946%	0.1868%
64	0.4426%	0.2033%
65	0.4966%	0.2218%
Ref	#1133sb0x0.6	#1134sb0x0.6

Applicable to calendar year 2014. Rates in future years are determined by the above rates and the MP-2014 projection scale.