Illinois Municipal Retirement Fund

Triennial Experience Study

2020 – 2022

GRS

January 4, 2024

Board of Trustees
Illinois Municipal Retirement Fund
Oak Brook, Illinois 60523

Ladies and Gentlemen:

The results of the 3-year *investigation of experience* of the Illinois Municipal Retirement Fund are presented in this report. The investigation was made for the purpose of updating the actuarial assumptions used in valuing the actuarial liabilities of IMRF in compliance with Section 7-213 of the Illinois Pension Code. Please note that this is the formal report (or addendum) to the 3-year Experience Study report presented to the Board on November 17, 2023.

The investigation was based upon the statistical data furnished for annual actuarial valuations, and upon supplemental information furnished by IMRF staff, concerning members who died, withdrew, became disabled or retired during the last 3 years and on published economic historical data.

The investigation covered the 3-year period from *January 1, 2020 to December 31, 2022* and was carried out using generally accepted actuarial principles and techniques.

We believe that the new actuarial assumptions that are the result of this investigation represent a reasonable estimate of future experience of IMRF based upon the data reviewed in the study and general trends among Public Employee Retirement Systems.

This report was prepared using our proprietary valuation model and related software which, in our professional judgment, has the capability to provide results that are consistent with the purposes of the valuation and has no material limitations or known weaknesses. We performed tests to ensure that the model reasonably represents that which is intended to be modeled. We are relying on the GRS actuaries and Internal Software, Training, and Processes Team who developed and maintain the model.

Mark Buis, Francois Pieterse and Bonnie Wurst are independent of the plan sponsor and are Members of the American Academy of Actuaries (MAAA) who meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

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All calculations have been made in conformity with generally accepted actuarial principles and practices, and with the Actuarial Standards of Practice issued by the Actuarial Standards Board and with applicable statutes.

Respectfully submitted,
Gabriel, Roeder, Smith & Company

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Executive Summary

Statutes (40 ILCS 5/7-213) require that the actuary conduct a general review of the experience of the fund "Experience Study" at least every three years. The last review was prepared for the period from January 1, 2017 to December 31, 2019. In this report, we review the current actuarial assumptions and methods and compare them to the actual experience of the Retirement Fund for the years 2020-2022.

The table below lists each of the primary assumptions and methods that we analyzed, including our recommendations for each item, and the impact of any recommended changes on average liabilities and contribution rates.

Assumption	Recommendation	Financial Impact
Withdrawal rates	Various	Decrease
Disability rates	Lower Rates	Decrease
Pay increases due to seniority	Higher Rates	Increase
Retirement rates	Various	Increase
Pre and post-retirement mortality rates	Various	Decrease
Interest rate	No Change	No Change
Wage inflation	No Change	No Change
Price inflation	No Change	No Change
Total	**Various**	**Decrease**

The overall impact on the contribution rate for various scenarios are shown on page 13. The effect on each employer will vary.

Introduction

Each year as of December 31, the liabilities of the Illinois Municipal Retirement Fund are valued. The purpose of the valuation is to adjust the contribution rates for IMRF employers to take into account changes in participant demographics and recent financial results as well as to measure the financial soundness of the benefit programs. In order to perform the valuation, assumptions must be made regarding the future experience of the system with regard to the following risk areas:

Non-Economic Assumptions

- Rates of quitting among active members.
- Rates of disability among active members.
- Patterns of merit & longevity pay increases to active members.
- Rates of retirement among active members.
- Rates of mortality among active members, retirees and beneficiaries.

Economic Assumptions

- Long-term rates of investment return to be generated by the assets of the Fund.
- Long-term rates of growth of total payroll also called wage inflation.
- Price Inflation.

Assumptions should be carefully chosen and continually monitored. 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 either benefit levels that are kept below the level that could be supported by the computed rate, or an unnecessarily large burden on the current generation of members, employers and taxpayers.

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

In recognition of this, Illinois statutes require that assumptions used to value the liabilities of IMRF be studied in depth every three years. The package of assumptions is then adjusted to reflect basic experience trends -- but not random year to year fluctuations. Actuarial assumptions were last revised following the December 31, 2019 regular actuarial valuation.

Summary of Findings – Non-Economic Assumptions

In general, the present assumptions provide a reasonable match to the experience of the past three years and recommended adjustments to assumptions are relatively minor. In most cases, when adjustments are indicated, the proposed assumptions give partial recognition to present assumptions as well as to results from actual experience. Complete recognition is rarely given to actual experience over a limited period.

Since the current study period is 2020 to 2022, we note that each of those years was impacted by the COVID-19 pandemic. While it is not anticipated that this recent experience will continue indefinitely into the future, there may be some lingering effects for years to come. As a result, we have moved about 25% of the way to the observed experience in this study. Prior studies would generally move 50% to 75% of the observed experience depending on whether the trend moved in the same direction of the prior study or reversed course from the prior studies.

In most recent experience studies, we have noticed that in order to develop assumptions that reduce the size of the gain or loss in a particular decrement it is necessary to consider 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 his or her 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, some of our tables include a column entitled 'liability' or 'benefit'. This represents the crude rate of decrement on a liability or benefit weighted basis as opposed to strictly a number count basis. The liability weighted rates were found to be most highly correlated with age-based withdrawal and retirement 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 is typically not a decision at all, rather an event that happens to someone. Comments on specific assumptions are provided on the following pages. Tabular results are presented in summary form on page 6.

Withdrawal Rates: A "withdrawal" or a quit is a separation from service without entitlement to an immediate monthly benefit. For age-based withdrawal, experience was found to be more highly correlated with the liability weighted method described above. Rates for the age-based tables were adjusted accordingly to be closer to the liability weighted rates. For service-based withdrawal, the traditional method based on counts was used. Rates for the service-based tables were adjusted to move closer to actual experience. Additionally, the breakpoint for the age-based tables was changed from 8 years to 10 years for the Regular Tier 2 group. The changes in withdrawal rates had downward pressure on contribution rates.

Disability Rates: A disability can be either a temporary disability or a permanent disability. Disabilities are initially reported as temporary and are not reclassified as permanent until after the end of the experience period. The actuary then adjusted disability rates to bring the number of expected permanent disabilities closer to the number of actual approved permanent disabilities. The changes in disability rates had slight downward pressure on contribution rates.

Pay Increase Rates (portion related to the employee's age and seniority): These rates are difficult to analyze because of the non-homogeneous nature of the IMRF population. For Regular members, rates were adjusted slightly to be closer to the actual rates. The change exerts slight upward pressure on contribution rates. For SLEP members, rates were not adjusted. Therefore, there was no impact on contribution rates.

Retirement Experience: Retirement experience was found to be highly correlated with the liability weighted method described on page 3. As such, we modified the retirement rates slightly for most groups to move closer to the liability weighted rates. As more experience emerges, we will monitor these rates to see if further adjustments are necessary. The changes in retirement assumptions had upward pressure on contribution rates for Regular members and SLEP members.

Mortality Experience: Post-retirement mortality is an important component in cost calculations and should be updated from time to time to reflect current and expected future longevity improvements. Pre-retirement mortality is a relatively minor component in cost calculations. The frequency of pre-retirement deaths is so low that mortality assumptions based on actual experience can only be produced for very large retirement systems, if at all.

Discussion: Pre-retirement mortality is used to measure the probabilities of active members dying before retirement. Post-retirement mortality is used to measure the probabilities of each benefit payment being made after retirement. The following mortality tables are currently used in the annual valuation of the Retirement System:

- **Healthy Post-Retirement:** The Pub-2010, Amount-Weighted, below-median income, General, Retiree, Male (adjusted 106%) and Female (adjusted 105%) tables, and future mortality improvements projected using scale MP-2020.

- **Healthy Pre-Retirement:** The Pub-2010, Amount-Weighted, below-median income, General, Employee, Male and Female (adjusted 100%) tables, and future mortality improvements projected using scale MP-2020.

- **Disability Retirement:** The Pub-2010, Amount-Weighted, below-median income, General, Disabled Retiree, Male and Female (adjusted 100%) tables, and future mortality improvements projected using scale MP-2020.

Summary of Findings – Non-Economic Assumptions (Continued)

Proposal: While COVID-19 impacted mortality rates significantly over the experience study period, we do not expect the elevated levels of mortality to continue indefinitely into the future. Allowing for partial credibility of the experience for this period, we recommend the following mortality tables for use in future valuations of the Retirement System; this change will slightly decrease measured liabilities:

- **Healthy Post-Retirement:** The Pub-2010, Amount-Weighted, below-median income, General, Retiree, Male (adjusted 108%) and Female (adjusted 106.4%) tables, and future mortality improvements projected using scale MP-2021.

- **Healthy Pre-Retirement:** The Pub-2010, Amount-Weighted, below-median income, General, Employee, Male and Female (adjusted 100%) tables, and future mortality improvements projected using scale MP-2021.

- **Disability Retirement:** The Pub-2010, Amount-Weighted, below-median income, General, Disabled Retiree, Male and Female (adjusted 100%) tables, and future mortality improvements projected using scale MP-2021.

Option Factors: The calculation of retirement benefit amounts involves the computation of survivor benefit options. If a retiring member elects an optional form of benefit, the standard form of benefit is multiplied by the appropriate option factor to produce the benefit actually payable. Currently, option factors for survivor benefits are calculated using a 7.25% interest rate assumption and assumed rates of mortality. As a matter of common practice, optional benefit reduction factors are usually revised to correspond with the new interest and mortality assumptions adopted after the last experience study. The use of a fully generational mortality table can make the development of option factors more complicated. Since there are many alternatives to consider, we recommend developing a set of alternative option factors after the Board has adopted the recommended mortality table and interest rate. Consistent with past practice, any change in option factors would be adopted for retirements on or after October 1, 2024 to allow time for administrative changes.

Other Risk Factors: Historically, the gain/loss reports have indicated a pattern of non-decrement losses. These have been attributed to various factors, including changes in final average compensation, rehire of former employees, addition of new employers, data refinements and differences between actual, increasing service due to sick leave and estimated reserve transfers. After reviewing the data for the last 3 years, we recommend decreasing this load from 1.50% to 1.40%. We will continue to monitor this assumption to see if future experience indicates a need for further change. We also recommend lowering the marriage assumption for males from 70% to 67% and females from 66% to 64%.

Assumptions for Tier 2 Members: Tier 2 members have different retirement eligibilities and will likely have different experience with regard to withdrawal, turnover, retirement and other assumptions. Current assumptions for Tier 2 are shown at the end of the report. Additionally, we recommend keeping the wage cap growth and COLA assumption for Tier 2 members at 1.13%.

Active Member Decrements
Comparison of Actual, Present, and Proposed Experience

	Regular						SLEP		
	Males			Females					
		Assumed			Assumed			Assumed	
Decrement	Actual	Present	Proposed	Actual	Present	Proposed	Actual	Present	Proposed
Normal Retirement (liability)									
Tier 1	15,234	13,656	14,057	17,496	15,817	16,229	3,965	3,581	3,682
Tier 2	74	60	63	47	32	35	15	20	19
Combined	15,308	13,716	14,120	17,543	15,849	16,264	3,980	3,601	3,701
Early Retirement (liability)									
Tier 1	3,885	3,078	3,299	3,648	2,999	3,174	0	0	0
Tier 2	58	53	54	51	50	50	4	8	7
Combined	3,943	3,131	3,353	3,699	3,049	3,224	4	8	7
Withdrawals									
Select (Headcount)									
Tier 1	1,571	1,410	1,450	4,321	3,677	3,837	6	6	7
Tier 2	12,877	11,400	11,762	26,986	24,231	24,905	474	349	385
Combined	14,448	12,810	13,212	31,307	27,908	28,742	480	355	392
Withdrawals									
Ultimate (Liability)									
Tier 1	2,698	2,207	2,325	3,287	2,652	2,806	698	370	492
Tier 2	109	45	60	157	65	92	87	35	48
Combined	2,807	2,252	2,385	3,443	2,717	2,898	785	405	540
Mortality (Benefit)									
Combined	1,051	999	1,013	812	790	795			
Permanent Disability									
Tier 1	9	35	28	10	35	27	1	3	2
Tier 2	4	18	15	2	15	12	0	1	1
Combined	13	53	43	12	50	39	1	3	3

This page compares actual total decrement experience during the 3-year experience period with experience that was assumed by the present assumption package and with experience that would have been assumed if the proposed assumptions had been in force throughout the experience period. The actual and assumed retirement counts include only people who retired directly from active service. People who retired after having previously separated from service with deferred vested benefits are excluded from all of the counts. Please note that due to the use of liability weighted rates, looking at people counts alone is not the best indicator for the appropriateness of a particular assumption. Assumptions for normal retirement, early retirement and withdrawal after 8 years for Regular (7 years for SLEP) use liability weighted rates.

For decrements based on liability or benefits, amounts above are scaled by $100,000.

Summary of Findings – Economic Assumptions

Economic assumptions include **long-term rates of investment return** (net of administrative and investment expenses), **wage inflation** (the across-the-board portion of salary increases), and pay increases due to **merit and seniority**. Unlike demographic activities, economic activities do not lend themselves to analysis solely on the basis of internal historical patterns because both salary increases and investment return are affected more by external forces; namely inflation (both wage and price), general productivity changes, and the local economic environment, all of which defy accurate long-term prediction. Estimates of economic activities are generally selected on the basis of the expectations in an inflation-free environment and then both long-term rates of investment return and wage inflation are increased by some provision for long-term inflation.

If inflation and/or productivity increases are lower than expected, it will probably result in both actual rates of salary increases and investment return below the assumed rates. Salaries increasing at rates less than expected produce lower liabilities. However, actual investment return below the assumed rate of investment return (whether due to manager performance, change in the mix of assets, or general market conditions) results in lower than expected asset amounts.

Sources considered in the analysis of the economic assumptions included:

- Actual system experience over the last 3 years (i.e., merit and seniority pay increases)
- Future expectations of various investment consultants
- 2023 Social Security Trustees Report
- Historical observations of inflation statistics (both price and wage) and investment returns

Current economic assumptions for the System are as follows:

Investment Return	7.25%
Wage Inflation	2.75%
Payroll Growth	2.50%
Price Inflation	2.25%
Spread Between Investment Return and Wage Inflation	4.50%
Spread Between Investment Return and Price Inflation	5.00%

The remainder of this section addresses the economic assumptions other than pay increases due to merit and seniority. Pay increases due to merit and seniority are addressed on pages 41 to 46.

Economic Assumptions – ASOP No. 27

Guidance regarding the selection of economic assumptions for measuring pension obligations is provided by Actuarial Standards of Practice (ASOP) No. 27. The standard requires that the selected economic assumptions be consistent with each other. That is, the selection of the investment return assumption should be consistent with the selection of the wage inflation and price inflation assumptions.

ASOP No. 27 (applicable to valuation dates on or after September 30, 2014) defines a reasonable economic assumption as an assumption that has the following characteristics:

- (a) It is appropriate for the purpose of the measurement;
- (b) It reflects the actuary's professional judgment;
- (c) It takes into account historical and current economic data that is relevant as of the valuation date;
- (d) 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
- (e) It has no significant bias (i.e., it is not significantly optimistic or pessimistic), except when provisions for adverse deviation or plan provisions that are difficult to measure are included and disclosed under Section 3.5.1, or when alternative assumptions are used for the assessment of risk.

Summary of Findings – Economic Assumptions
(Continued)

Price Inflation. Price inflation underlies both the wage inflation and investment return assumptions. For that reason, we recommend that a specific price inflation assumption be adopted in conjunction with this Experience Study. The chart below shows forward looking inflation expectations from various published sources as of December 31, 2022. Over the past 50 years, price inflation has averaged 4.0%. This result is heavily affected by the high inflationary period of the 1970s and early 1980s. The 2023 Social Security Trustees report uses 2.4% as the long-range intermediate price inflation assumption. Additionally, the average future price inflation of the investment firms we surveyed is 2.5%. **While very recent inflation experience has increased, longer term forecasts are still at relatively low levels. Therefore, we recommend no change to the current price inflation assumption of 2.25%.**

Forward-Looking Price Inflation Forecasts[a]	
Congressional Budget Office[b]	
5-Year Annual Average	3.23%
10-Year Annual Average	2.81%
Federal Reserve Bank of Philadelphia[c]	
5-Year Annual Average	3.75%
10-Year Annual Average	2.95%
Federal Reserve Bank of Cleveland[d]	
10-Year Expectation	2.22%
20-Year Expectation	2.29%
30-Year Expectation	2.37%
Federal Reserve Bank of St. Louis[e]	
10-Year Breakeven Inflation	2.26%
20-Year Breakeven Inflation	2.50%
30-Year Breakeven Inflation	2.26%
U.S. Department of the Treasury[f]	
10-Year Breakeven Inflation	2.07%
20-Year Breakeven Inflation	2.40%
30-Year Breakeven Inflation	2.21%
50-Year Breakeven Inflation	2.34%
100-Year Breakeven Inflation	2.44%
Social Security Trustees[g]	
Ultimate Intermediate Assumption	2.40%

[a]End of the Fourth Quarter, 2022. Version 2023-02-09 by Gabriel, Roeder, Smith & Company.

[b]*The Budget and Economic Outlook: 2022 to 2032*, Release Date: May 2022, Consumer Price Index (CPI-U), Percentage Change from Year to Year, 5-Year Annual Average (2022 - 2026), 10-Year Annual Average (2022 - 2031).

[c]*Fourth Quarter 2022 Survey of Professional Forecasters*, Release Date: November 14, 2022, Headline CPI, Annualized Percentage Points, 5-Year Annual Average (2022 - 2026), 10-Year Annual Average (2022 - 2031).

[d]Inflation Expectations, Model output date: December 1, 2022.

[e]The breakeven inflation rate represents a measure of expected inflation derived from X-Year Treasury Constant Maturity Securities and X-Year Treasury Inflation-Indexed Constant Maturity Securities. Observation date: December, 2022.

[f]The Treasury Breakeven Inflation (TBI) Curve, Monthly Average Rates, December, 2022.

[g]*The 2022 Annual Report of The Board of Trustees of The Federal Old-Age And Survivors Insurance and Federal Disability Insurance Trust Funds*, June 2, 2022, Long-range (75-year) assumptions, Intermediate, Consumer Price Index (CPI-W), for 2026 and later.

Summary of Findings – Economic Assumptions (Continued)

Wage Inflation and Payroll Growth. Wage inflation consists of two components, 1) a portion due to pure price inflation (i.e., increases due to changes in the CPI), and 2) increases in average salary levels in excess of pure price inflation (i.e., increases due to changes in productivity levels, supply and demand in the labor market and other macroeconomic factors). The long-term rate of increase in National Average Earnings over the last 50 years is somewhat higher than the current IMRF assumption, although shorter term averages are below it. It is expected that, in the long run, salary increases in all parts of the country will be close to the national averages. However, few economists are forecasting a repeat of the high inflation rates experienced in the 1970s. In addition, average salaries in IMRF have risen at approximately 2.7% over the last 25 years and 2.4% for the last 10 years. **While very recent wage inflation has seen increases, given that this assumption was lowered in the most recent study and these years were impacted by the pandemic, we recommend additional years of experience before reversing the longer-term trend. Therefore, we recommend no change to the current wage inflation assumption of 2.75%.**

Year	Annual Increase in		
	Prices (CPI-U)	Wages (NAE)	Difference
1965-1974	5.2%	5.8%	0.6%
1975-1984	7.3%	7.2%	-0.1%
1985-1994	3.6%	3.9%	0.3%
1995-2004	2.4%	4.1%	1.7%
2005-2014	2.1%	2.7%	0.6%
2015-2022	3.3%	3.8%	0.5%
3-Year Avg	4.9%	5.0%	0.1%
5-Year Avg	3.8%	4.5%	0.7%
10-Year Avg	2.6%	3.5%	0.9%
20-Year Avg	2.5%	3.2%	0.7%
30-Year Avg	2.5%	3.4%	0.9%
50-Year Avg	4.0%	4.4%	0.4%

Payroll Growth. The payroll growth assumption differs from the wage inflation assumption in that the payroll growth assumption is used in the amortization method to project wages for the purposes of determining the contribution rate as a percentage of total payroll, whereas the wage inflation is used to project each member's future salary for estimating retirement benefits. Historically, the payroll growth assumption has mirrored the wage inflation assumption. However, there are a couple of reasons that might cause these rates to be different. First, if there is a decline in the active population, the total payroll might not grow as fast as individual wages and vice-versa. Also, even if there is not a decline in the active population, the retirements of the baby boom generation often result in a large cohort of new hires with low wages replacing older members at higher wages, putting downward pressure on the total payroll. If this payroll growth rate is overstated, this can result in insufficient contributions. For IMRF, the average increase in total payroll was 3.2% for the last 3 years. Given the last 3 years were unduly impacted by the pandemic, we recommend no change at this time to the payroll growth assumption of 2.50% used in the amortization factors.

Investment Return. The investment return assumption is the actuarial assumption that has the largest impact on actuarial valuation results. As more of the actuarial accrued liabilities are related to non-active members, the <u>nominal</u> (as opposed to real) investment return assumption becomes a more prominent factor. Since one of IMRF's fundamental financial objectives is the receipt of level contributions over time, the discount rate assumption is set equal to the investment return assumption (with perhaps a margin for adverse deviation).

Presented below is the approximate current asset allocation for IMRF:

Asset Class	Approximate Asset Allocation
Domestic Equity	35.5%
International Equity	18.0
Fixed Income	25.5
Real Estate	10.5
Alternative Investments	9.5
Cash Equivalents	1.0

Because GRS is a benefit consulting firm and does not develop or maintain its own capital market expectations, we monitor forward-looking expectations developed by several investment firms. Based upon the above target asset allocation, future return expectations of various investment firms were analyzed using the GRS Capital Market Assumptions Modeler (CMAM). For the 2023 GRS CMAM, 10-year capital market expectations were provided by 11 investment firms and 20- to 30-year capital market expectations were provided by 7 investment firms. Capital market expectations are already net of passive investment expenses. Final expected nominal investment return results from the GRS CMAM are based upon the recommended 2.25% price inflation assumption.

Summary of Findings – Economic Assumptions (Concluded)

Presented below are the short-term (i.e., 10 years) and long-term (i.e., 20 to 30 years) expected returns for the System based upon the capital market expectations of the investment firms included in the GRS CMAM:

Summary of GRS 2023 CMAM Analysis	
10-Year Capital Market Expectations **Average of 11 Investment Firms**	
1-Year Expected Return	7.30%
Standard Deviation of 1-Year Expected Return	12.09%
Short-Term Expected Median Return (i.e., 50th Percentile)	6.63%
20- to 30-Year Capital Market Expectations **Average of 7 Investment Firms**	
Long-Term Expected Median Return (i.e., 50th Percentile)	6.90%

In addition, we also reviewed information for the most recent NASRA survey. According to this survey, the average assumed return for all Statewide Retirement Systems is 7.0% (see chart below). It is important to understand though that the NASRA survey reflects national average assumed rates of return, which may not be indicative of IMRF's asset allocation.
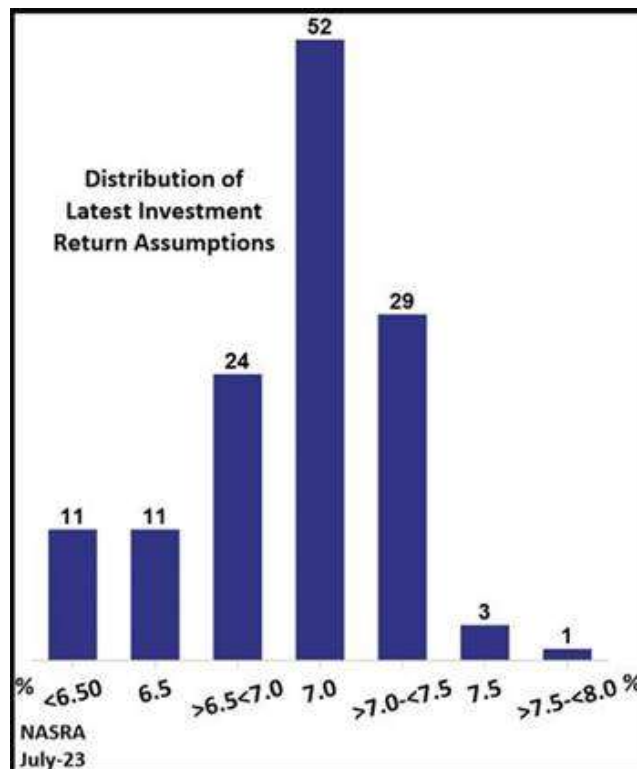
Taking everything into account, we recommend no change to the current investment return of 7.25% at this time.

Summary of Findings
Average Effect on Contribution Rates
(Results Based upon December 31, 2022 Data)

	12/31/2022 Results	
	Current Assumptions	Proposed Assumptions
Price Inflation	2.25%	2.25%
Wage Inflation	2.75%	2.75%
Investment Return	7.25%	7.25%
Regular Employers - Contribution Rate	6.7%	6.5%
SLEP Employers - Contribution Rate	18.0%	17.2%
Total Plan - Funded Status	98.2%	98.2%

The above results are presented as an aid in understanding the average combined effects of the changes in assumptions that have been proposed in this experience study. Results are approximate and indicate only the general direction and approximate average magnitude of the effects of the assumption changes. *Contribution rates for 2024 have already been scheduled based upon the December 31, 2022 regular valuation and are not affected by the experience study*. Each employer would be affected differently. Contribution rates for 2025 will be determined in the 2023 actuarial valuation, which will take into account all of the new assumptions and actual experience during 2023.

Standard Deviation Graph
Example
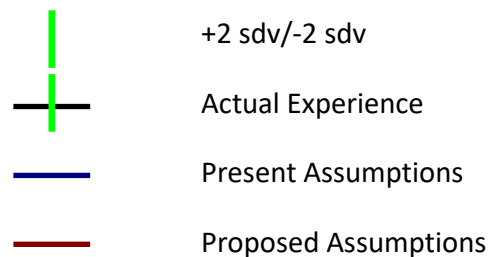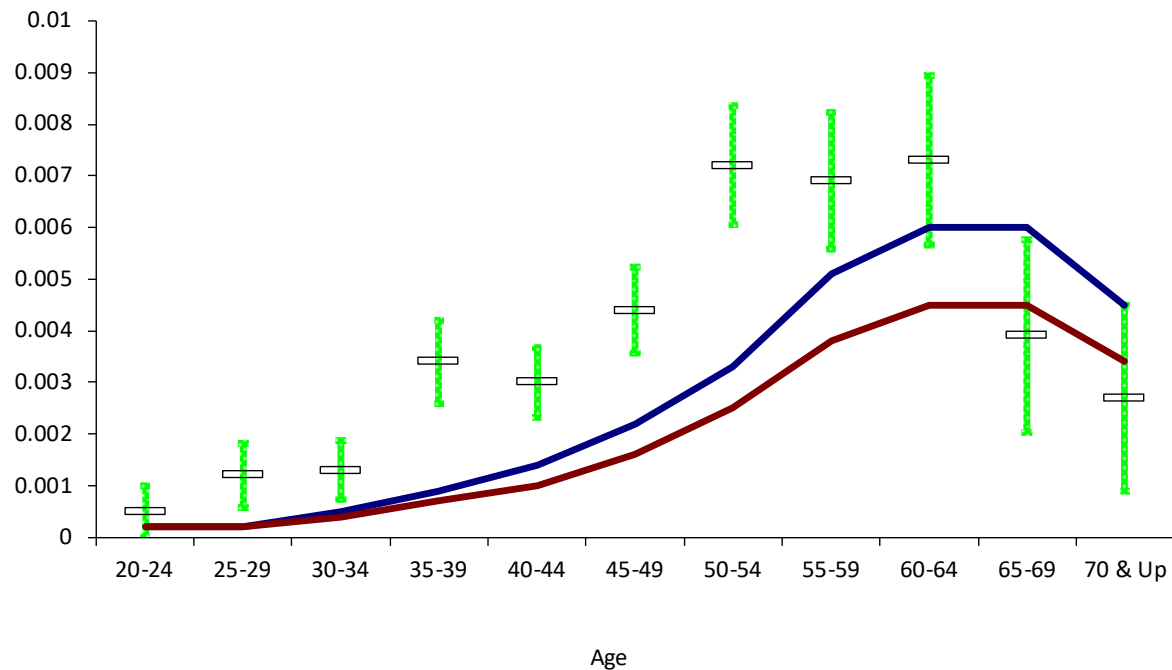
Standard Deviation graphs of the type shown above appear frequently in this report. The navy blue line represents the present assumptions used in the valuation. After experience is reviewed for a given decrement, an actual value is computed (based on actual experience) along with its standard deviation value. The green vertical bars on the graph above represent the standard deviation value. If the standard deviation value is large, this means that the group being tested is from a small population. A small group should have less influence on deriving the new proposed value than a large group. In comparison, if the standard deviation has a small value, this means the group being tested is from a large population and should have a greater impact on the decision of the proposed value.

WITHDRAWAL EXPERIENCE

Regular Males Withdrawal Experience

There were 1,571 withdrawals and 10,412 years of exposure included in the male service-based withdrawal investigation for members with less than 8 years of service. Currently, the threshold for the Tier 1 service-based table is 8 years. The proposed rates recommend the same threshold and slightly higher rates of withdrawal.

Tier 1 Male Service-Based Withdrawals

Service Index	Withdrawals	Exposure	Actual Rates	Sample Rates Present	Sample Rates Proposed	Expected Withdrawals Present	Expected Withdrawals Proposed
1	238	950	0.2505	0.2480	0.2490	236	237
2	319	1,632	0.1955	0.1980	0.1970	323	322
3	254	1,506	0.1687	0.1530	0.1570	230	236
4	200	1,408	0.1420	0.1330	0.1350	187	190
5	188	1,373	0.1369	0.1070	0.1140	147	157
6	151	1,325	0.1140	0.0875	0.0940	116	125
7	115	1,301	0.0884	0.0770	0.0825	100	107
8	106	917	0.1156	0.0770	0.0825	71	76
9	113	728	0.1552			-	-
10	131	1,155	0.1134			-	-
11	161	1,807	0.0891			-	-
12	182	2,564	0.0710			-	-
13	207	3,025	0.0684			-	-
14	178	3,205	0.0555			-	-
15	181	3,150	0.0575			-	-
16	179	2,830	0.0633			-	-
17	133	2,493	0.0533			-	-
18	110	2,211	0.0498			-	-
19	104	2,098	0.0496			-	-
20	89	2,123	0.0419			-	-
21	88	2,195	0.0401			-	-
22	84	2,083	0.0403			-	-
23	73	1,841	0.0397			-	-
24	69	1,510	0.0457			-	-
25	55	1,277	0.0431			-	-
26	34	1,057	0.0322			-	-
27	28	896	0.0313			-	-
28	31	739	0.0419			-	-
29	27	624	0.0433			-	-
30 & over	136	2,292	0.0593			-	-
Totals (Less Than or Equal to 8)	1,571	10,412	0.1509	0.1354	0.1393	1,410	1,450

	Actual	Present	Proposed
Current	0.1509	0.1354	0.1393
Previous Investigation Results	0.1503	0.1436	0.1469
2014-2016	0.1484	0.1377	0.1429
2011-2013	0.1380	0.1186	0.1293

Regular Males Withdrawal Experience

There were 12,877 withdrawals and 83,758 years of exposure included in the male service-based withdrawal investigation for members with less than 10 years of service. Currently, the threshold for the Tier 2 service-based table is 8 years. The proposed rates recommend an increase in the threshold to 10 years and slightly higher rates of withdrawal.

Tier 2 Male Service-Based Withdrawals

Service Index	Withdrawals	Exposure	Actual Rates	Sample Rates Present	Sample Rates Proposed	Expected Withdrawals Present	Expected Withdrawals Proposed
1	2,417	8,923	0.2709	0.2480	0.2540	2,213	2,266
2	3,186	14,209	0.2242	0.1980	0.2050	2,813	2,913
3	2,062	11,815	0.1745	0.1530	0.1580	1,808	1,867
4	1,507	10,260	0.1469	0.1330	0.1360	1,365	1,395
5	1,149	8,836	0.1300	0.1070	0.1130	945	998
6	841	7,833	0.1074	0.0875	0.0920	685	721
7	663	7,102	0.0934	0.0770	0.0810	547	575
8	501	6,140	0.0816	0.0770	0.0780	473	479
9	342	5,231	0.0654		0.0650	342	340
10	209	3,409	0.0613		0.0610	209	208
11	137	1,645	0.0833			-	-
12	48	474	0.1013			-	-
13	9	33	0.2727			-	-
14	2	25	0.0800			-	-
15	1	22	0.0455			-	-
16	1	12	0.0833			-	-
17	1	10	0.1000			-	-
18	1	2	0.5000			-	-
19	-	1	0.0000			-	-
20	-	1	0.0000			-	-
21	-	2	0.0000			-	-
22	-	3	0.0000			-	-
23	1	3	0.3333			-	-
24	-	2	0.0000			-	-
25	-	2	0.0000			-	-
26	-	-	N\A			-	-
27	-	1	0.0000			-	-
28	-	1	0.0000			-	-
29	-	1	0.0000			-	-
30 & over	1	-	N\A			-	-
Totals (Less Than or Equal to 10)	12,877	83,758	0.1537	0.1361	0.1404	11,400	11,762

	Actual	Present	Proposed
Current	0.1537	0.1361	0.1404
Previous Investigation Results	0.1503	0.1436	0.1469
2014-2016	0.1484	0.1377	0.1429
2011-2013	0.1380	0.1186	0.1293

Regular Males Withdrawal Experience
($ amounts below are scaled by a factor of $100,000)

There were $2,698 in liability that was withdrawn during the experience study period and $92,881 in liability that was exposed to being withdrawn included in the male age-based withdrawal investigation for members with 8 or more years of service. Age-based withdrawal was found to be more highly correlated with the liability weighted rates and therefore the proposed rates were increased to be closer to these rates.

Tier 1 Male Age-Based Withdrawals
With More Than 8 Years of Service

Age	Withdrawals	Exposure	Actual Rates Weighted by		Sample Rates*		Expected Withdrawals	
			Population	Liability	Present	Proposed	Present	Proposed
25-29	1	33	0.0714	0.0458	0.0520	0.0450	2	1
30-34	69	1,546	0.0526	0.0447	0.0460	0.0450	67	66
35-39	336	7,963	0.0555	0.0423	0.0325	0.0350	261	277
40-44	556	17,058	0.0411	0.0326	0.0280	0.0290	472	495
45-49	795	24,815	0.0420	0.0321	0.0225	0.0250	565	616
50-54	940	41,467	0.0334	0.0227	0.0200	0.0205	840	870
Totals	2,698	92,881	0.0415	0.0290	0.0238	0.0250	2,207	2,325

	Actual	Liability		Proposed
Current	0.0415	0.0290		0.0250
Previous Investigation Results	0.0394	0.0263		0.0266
2014-2016	0.0354	0.0236		0.0246
2011-2013	0.0297	0.0204		0.0232

* *Sample rates are taken from midpoint of age group.*

Regular Males Withdrawal Experience
($ amounts below are scaled by a factor of $100,000)

There were $109.4 in liability that was withdrawn during the experience study period and $1,601.3 in liability that was exposed to being withdrawn included in the male age-based withdrawal investigation for members with 10 or more years of service. Age-based withdrawal was found to be more highly correlated with the liability weighted rates and therefore the proposed rates were increased to be closer to these rates.

Tier 2 Male Age-Based Withdrawals
With More Than 10 Years of Service

Age	Withdrawals	Exposure	Actual Rates Weighted by		Sample Rates*		Expected Withdrawals	
			Population	Liability	Present	Proposed	Present	Proposed
25-29	1.8	9.0	0.2000	0.2063	0.0520	0.0600	0.4	0.5
30-34	11.8	209.3	0.0750	0.0563	0.0460	0.0490	9.2	10.2
35-39	25.9	342.8	0.0936	0.0757	0.0325	0.0430	11.6	14.8
40-44	15.2	244.4	0.0714	0.0622	0.0280	0.0370	6.9	9.1
45-49	13.2	212.8	0.0669	0.0621	0.0225	0.0320	4.9	6.9
50-54	9.2	211.7	0.0590	0.0434	0.0200	0.0320	4.3	6.8
55-59	16.5	236.4	0.0819	0.0697	0.0200	0.0320	4.7	7.6
60-64	15.8	135.0	0.2484	0.1167	0.0200	0.0320	2.7	4.3
Totals	109.4	1,601.3	0.0902	0.0683	0.0279	0.0376	44.7	60.2

	Actual	Liability		Proposed
Current	0.0902	0.0683		0.0376
Previous Investigation Results	0.0394	0.0263		0.0266
2014-2016	0.0354	0.0236		0.0246
2011-2013	0.0297	0.0204		0.0232

* *Sample rates are taken from midpoint of age group.*

Regular Males Withdrawal Experience

Tier 1 Male Service-Based Withdrawals

Legend: Actual Experience — Present Assumptions — Proposed Assumptions

Tier 1 Male Age-Based Withdrawals
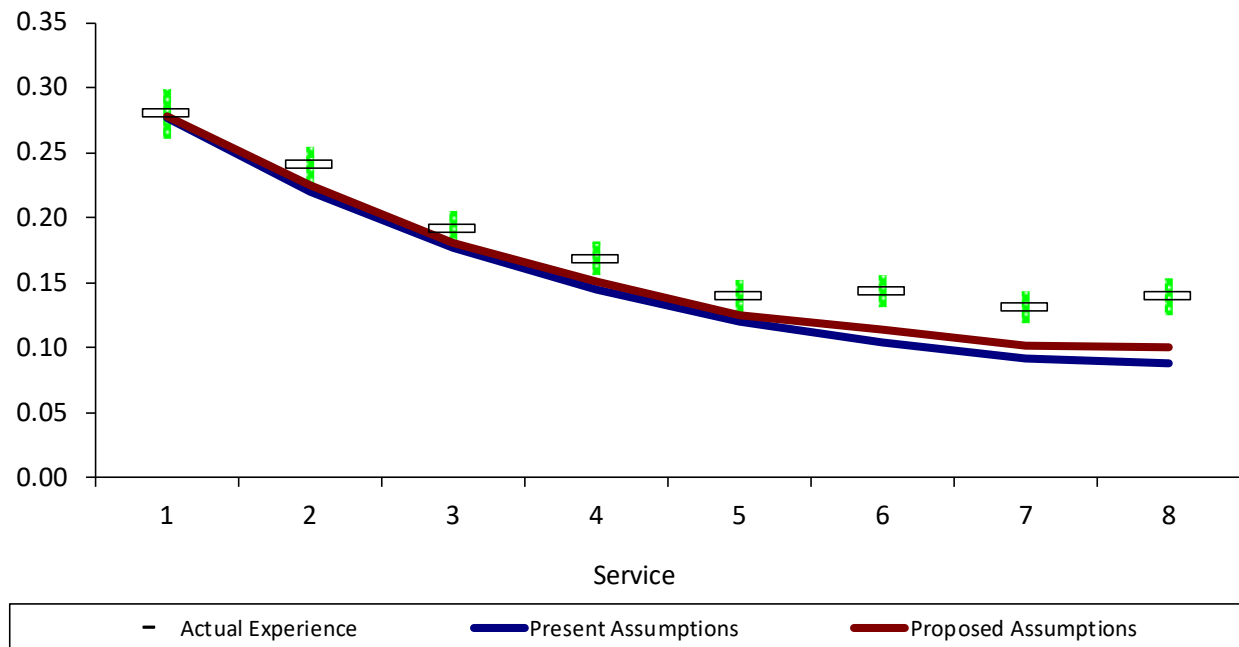
Legend: Actual Experience — Present Assumptions — Proposed Assumptions
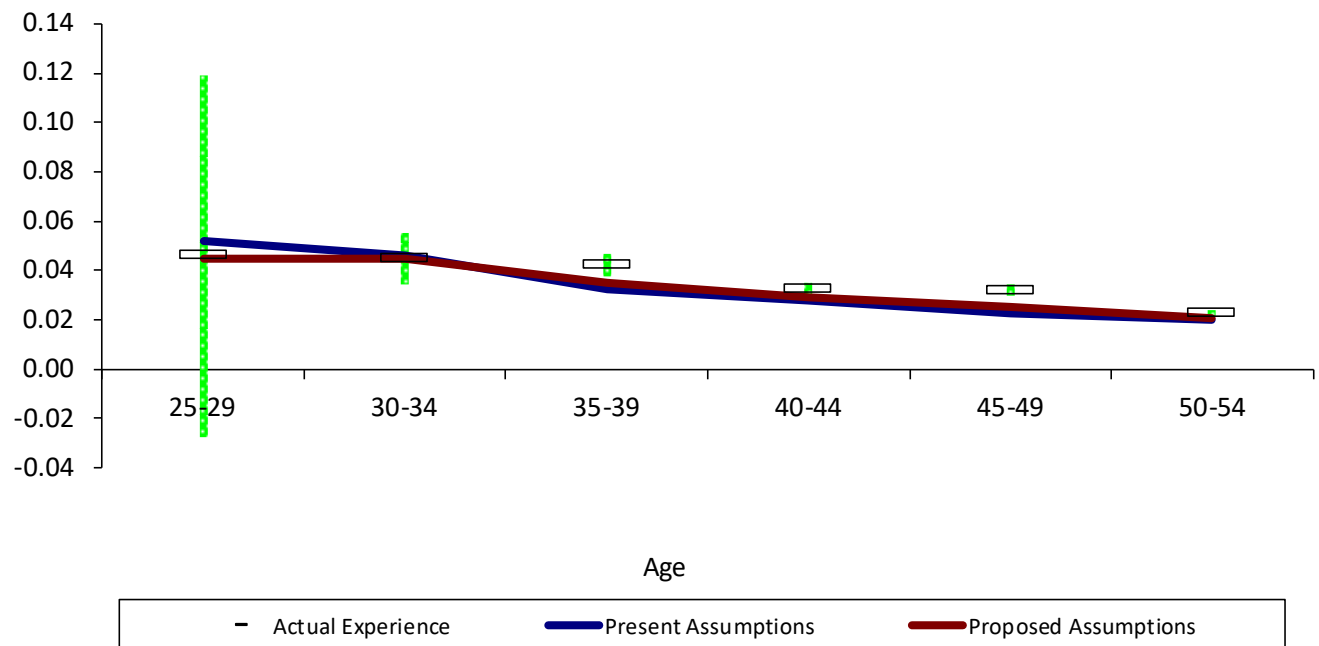
Regular Males Withdrawal Experience

Tier 2 Male Service-Based Withdrawals

Legend: − Actual Experience — Present Assumptions — Proposed Assumptions

Tier 2 Male Age-Based Withdrawals

Legend: − Actual Experience — Present Assumptions — Proposed Assumptions
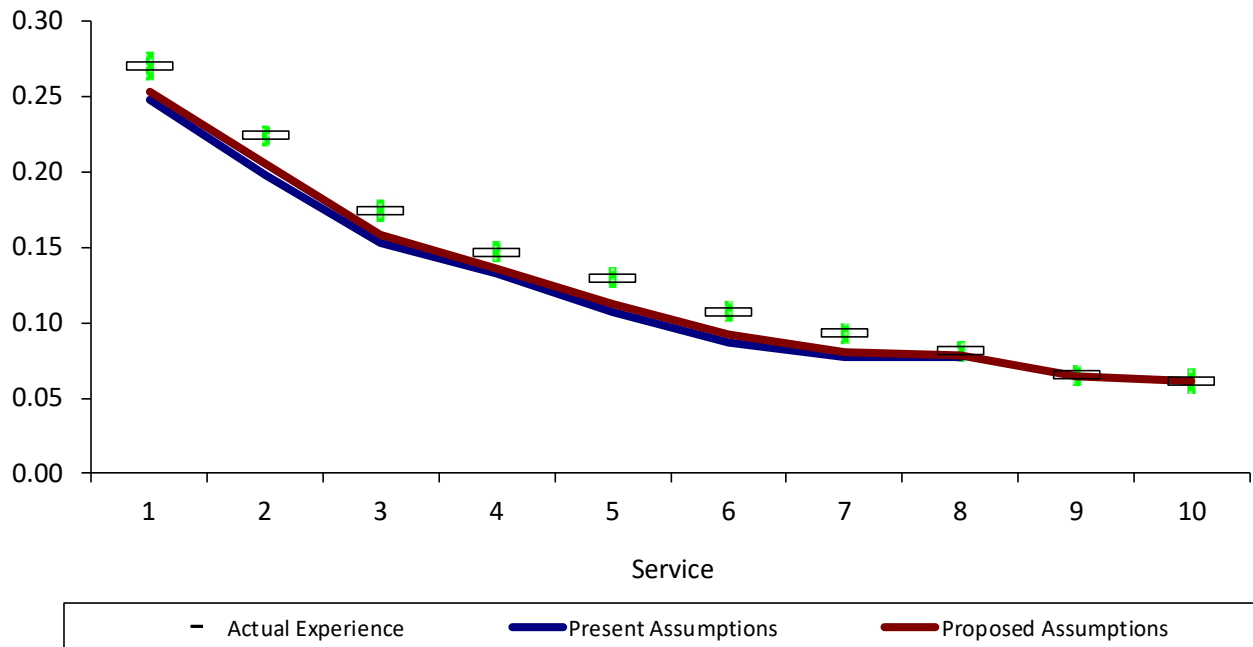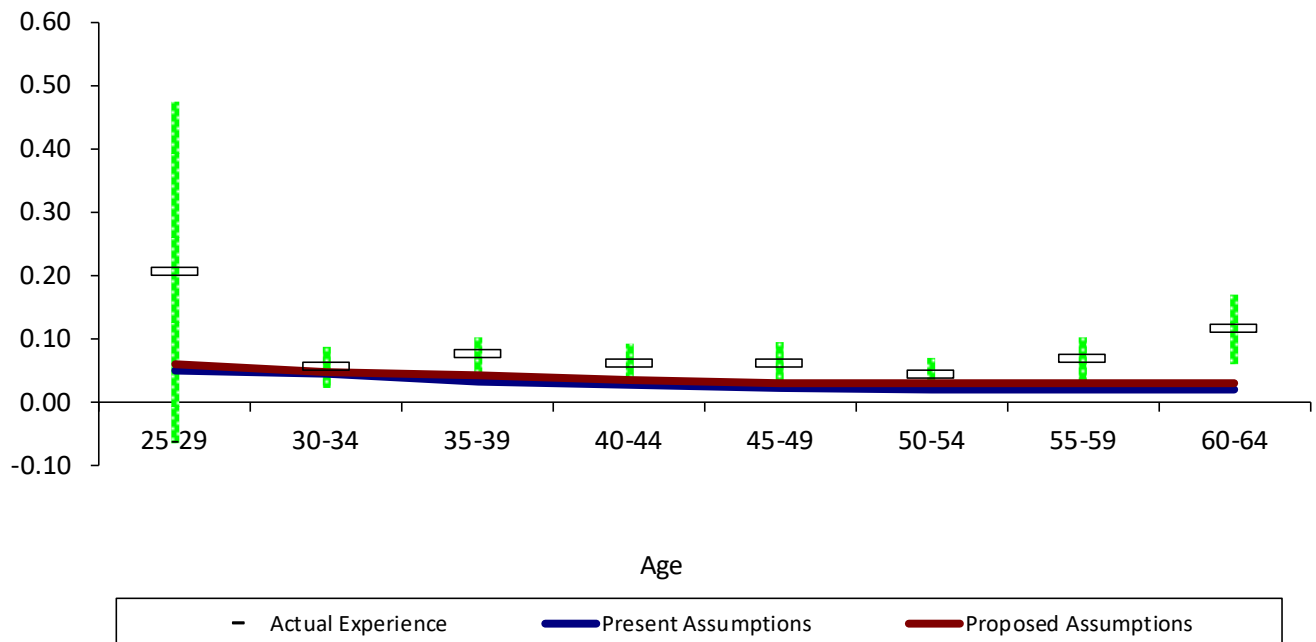
Regular Females Withdrawal Experience

There were 4,321 withdrawals and 24,315 years of exposure included in the female service-based withdrawal investigation for members with less than 8 years of service. Currently, the threshold for the Tier 1 service-based table is 8 years. The proposed rates recommend the same threshold and slightly higher rates of withdrawal.

Tier 1 Female Service-Based Withdrawals

Service Index	Withdrawals	Exposure	Actual Rates	Sample Rates Present	Sample Rates Proposed	Expected Withdrawals Present	Expected Withdrawals Proposed
1	602	2,149	0.2801	0.2770	0.2780	595	597
2	852	3,536	0.2410	0.2200	0.2250	778	796
3	659	3,435	0.1918	0.1775	0.1810	610	622
4	560	3,317	0.1688	0.1450	0.1510	481	501
5	443	3,172	0.1397	0.1200	0.1250	381	397
6	464	3,221	0.1441	0.1045	0.1140	337	367
7	408	3,102	0.1315	0.0920	0.1020	285	316
8	333	2,383	0.1397	0.0880	0.1010	210	241
9	305	1,746	0.1747			-	-
10	329	2,366	0.1391			-	-
11	426	3,310	0.1287			-	-
12	489	4,261	0.1148			-	-
13	519	4,935	0.1052			-	-
14	529	5,142	0.1029			-	-
15	437	4,816	0.0907			-	-
16	369	4,072	0.0906			-	-
17	275	3,353	0.0820			-	-
18	239	2,806	0.0852			-	-
19	188	2,630	0.0715			-	-
20	157	2,575	0.0610			-	-
21	151	2,503	0.0603			-	-
22	134	2,165	0.0619			-	-
23	131	1,799	0.0728			-	-
24	88	1,426	0.0617			-	-
25	74	1,118	0.0662			-	-
26	67	904	0.0741			-	-
27	49	735	0.0667			-	-
28	32	601	0.0532			-	-
29	25	490	0.0510			-	-
30 & over	134	1,573	0.0852			-	-
Totals (Less Than or Equal to 8)	4,321	24,315	0.1777	0.1512	0.1578	3,677	3,837

	Actual	Present	Proposed
Current	0.1777	0.1512	0.1578
Previous Investigation Results	0.1707	0.1708	0.1707
2014-2016	0.1722	0.1591	0.1656
2011-2013	0.1565	0.1363	0.1462

Regular Females Withdrawal Experience

There were 26,986 withdrawals and 151,067 years of exposure included in the female service-based withdrawal investigation for members with less than 10 years of service. Currently, the threshold for the Tier 2 service-based table is 8 years. The proposed rates recommend an increase in the threshold to 10 years and slightly higher rates of withdrawal.

Tier 2 Female Service-Based Withdrawals

Service Index	Withdrawals	Exposure	Actual Rates	Sample Rates Present	Sample Rates Proposed	Expected Withdrawals Present	Expected Withdrawals Proposed
1	5,408	18,538	0.2917	0.2770	0.2810	5,135	5,209
2	6,646	27,414	0.2424	0.2200	0.2260	6,031	6,196
3	4,537	22,973	0.1975	0.1775	0.1820	4,078	4,181
4	3,216	19,204	0.1675	0.1450	0.1510	2,785	2,900
5	2,297	15,818	0.1452	0.1200	0.1260	1,898	1,993
6	1,689	13,267	0.1273	0.1045	0.1100	1,386	1,459
7	1,249	11,396	0.1096	0.0920	0.0960	1,048	1,094
8	917	9,585	0.0957	0.0880	0.0900	843	863
9	634	7,877	0.0805		0.0800	634	630
10	393	4,995	0.0787		0.0760	393	380
11	232	2,293	0.1012			-	-
12	63	611	0.1031			-	-
13	8	35	0.2286			-	-
14	1	29	0.0345			-	-
15	3	21	0.1429			-	-
16	1	18	0.0556			-	-
17	1	11	0.0909			-	-
18	-	3	0.0000			-	-
19	1	5	0.2000			-	-
20	-	4	0.0000			-	-
21	-	7	0.0000			-	-
22	1	6	0.1667			-	-
23	-	7	0.0000			-	-
24	-	3	0.0000			-	-
25	1	3	0.3333			-	-
26	-	1	0.0000			-	-
27	-	1	0.0000			-	-
28	-	-	N\A			-	-
29	-	-	N\A			-	-
30 & over	1	1	1.0000			-	-
Totals (Less Than or Equal to 10)	26,986	151,067	0.1786	0.1604	0.1649	24,231	24,905

	Actual	Present	Proposed
Current	0.1786	0.1604	0.1649
Previous Investigation Results	0.1707	0.1708	0.1707
2014-2016	0.1722	0.1591	0.1656
2011-2013	0.1565	0.1363	0.1462

Regular Females Withdrawal Experience
($ amounts below are scaled by a factor of $100,000)

There were $3,287 in liability withdrawn during the experience study period and $74,994 in liability that was exposed to being withdrawn included in the female age-based withdrawal investigation for members with 8 or more years of service. Age-based withdrawal was found to be highly correlated with the liability weighted rates and therefore the proposed rates were increased to be closer to those rates.

Tier 1 Female Age-Based Withdrawals
With More Than 8 Years of Service

Age	Withdrawals	Exposure	Actual Rates Weighted by		Sample Rates*		Expected Withdrawals	
			Population	Liability	Present	Proposed	Present	Proposed
25-29	2	7	0.2353	0.2608	0.0880	0.1010	1	1
30-34	58	754	0.0910	0.0766	0.0700	0.0705	50	51
35-39	334	5,198	0.0823	0.0643	0.0510	0.0535	265	276
40-44	623	12,277	0.0692	0.0508	0.0430	0.0445	523	543
45-49	832	19,787	0.0615	0.0420	0.0345	0.0360	687	720
50-54	1,438	36,971	0.0576	0.0389	0.0300	0.0325	1,126	1,215
Totals	3,287	74,994	0.0643	0.0438	0.0354	0.0374	2,652	2,806

	Actual	Liability		Proposed
Current	0.0643	0.0438		0.0374
Previous Investigation Results	0.0558	0.0374		0.0382
2014-2016	0.0543	0.0369		0.0363
2011-2013	0.0440	0.0325		0.0327

* Sample rates are taken from midpoint of age group.

Regular Females Withdrawal Experience
($ amounts below are scaled by a factor of $100,000)

There were $156.7 in liability withdrawn during the experience study period and $1,669.5 in liability that was exposed to being withdrawn included in the female age-based withdrawal investigation for members with 10 or more years of service. Age-based withdrawal was found to be highly correlated with the liability weighted rates and therefore the proposed rates were increased to be closer to those rates.

Tier 2 Female Age-Based Withdrawals
With More Than 10 Years of Service

Age	Withdrawals	Exposure	Actual Rates Weighted by		Sample Rates*		Expected Withdrawals	
			Population	Liability	Present	Proposed	Present	Proposed
25-29	1.0	4.6	0.2308	0.2295	0.0880	0.0760	0.4	0.3
30-34	12.7	135.1	0.0993	0.0939	0.0700	0.0760	9.0	10.0
35-39	27.4	251.8	0.1071	0.1087	0.0510	0.0650	13.2	16.6
40-44	21.9	193.9	0.1120	0.1129	0.0430	0.0605	8.4	11.6
45-49	26.6	270.2	0.1021	0.0986	0.0345	0.0505	9.4	13.8
50-54	26.7	299.7	0.0829	0.0890	0.0300	0.0480	9.2	14.5
55-59	23.2	377.2	0.0868	0.0645	0.0300	0.0480	11.3	18.1
60-64	17.2	137.0	0.1729	0.1259	0.0300	0.0480	4.1	6.6
Totals	156.7	1,669.5	0.1023	0.0946	0.0389	0.0548	65.0	91.5

	Actual	Liability		Proposed
Current	0.1023	0.0946		0.0548
Previous Investigation Results	0.0558	0.0374		0.0382
2014-2016	0.0543	0.0369		0.0363
2011-2013	0.0440	0.0325		0.0327

*   *Sample rates are taken from midpoint of age group.*

Regular Females Withdrawal Experience

Tier 1 Female Service-Based Withdrawals
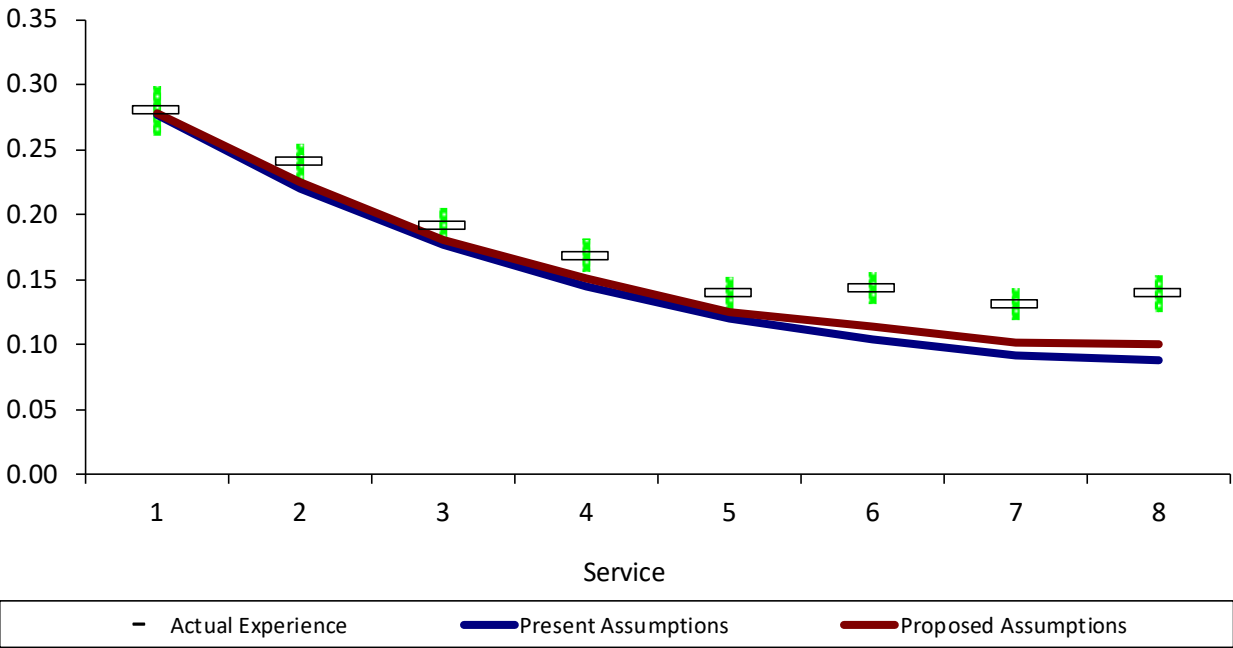
Tier 1 Female Age-Based Withdrawals
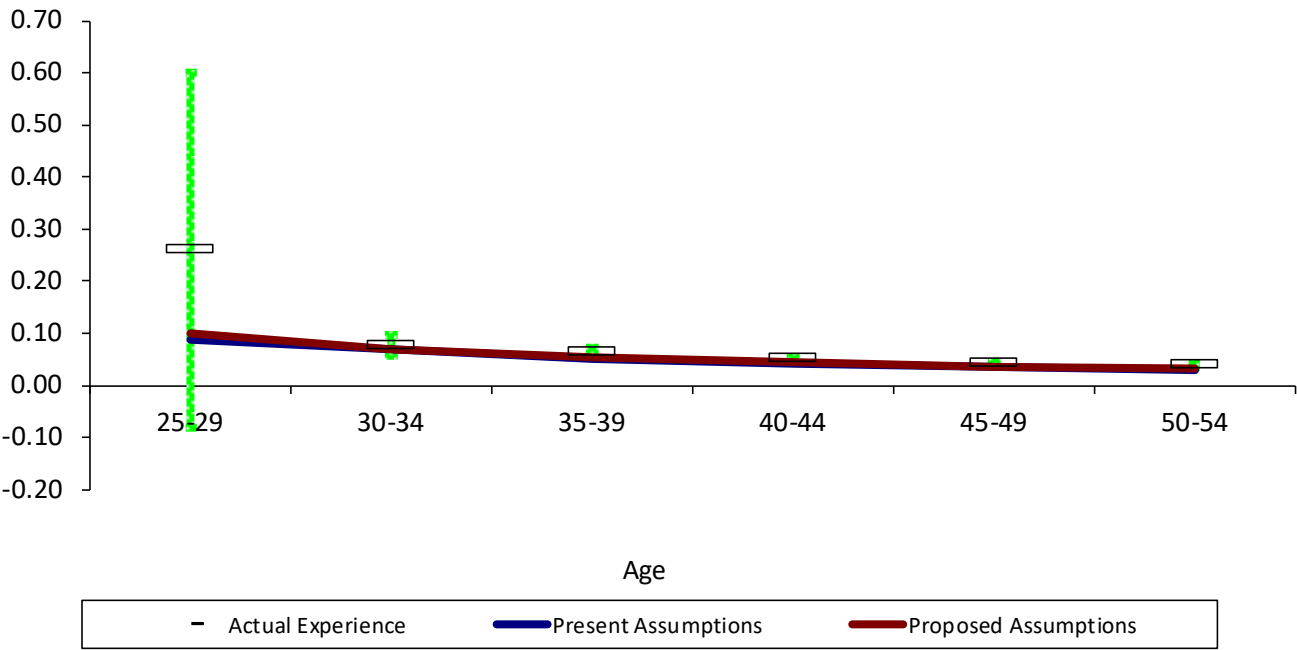
Regular Females Withdrawal Experience

Tier 2 Female Service-Based Withdrawals
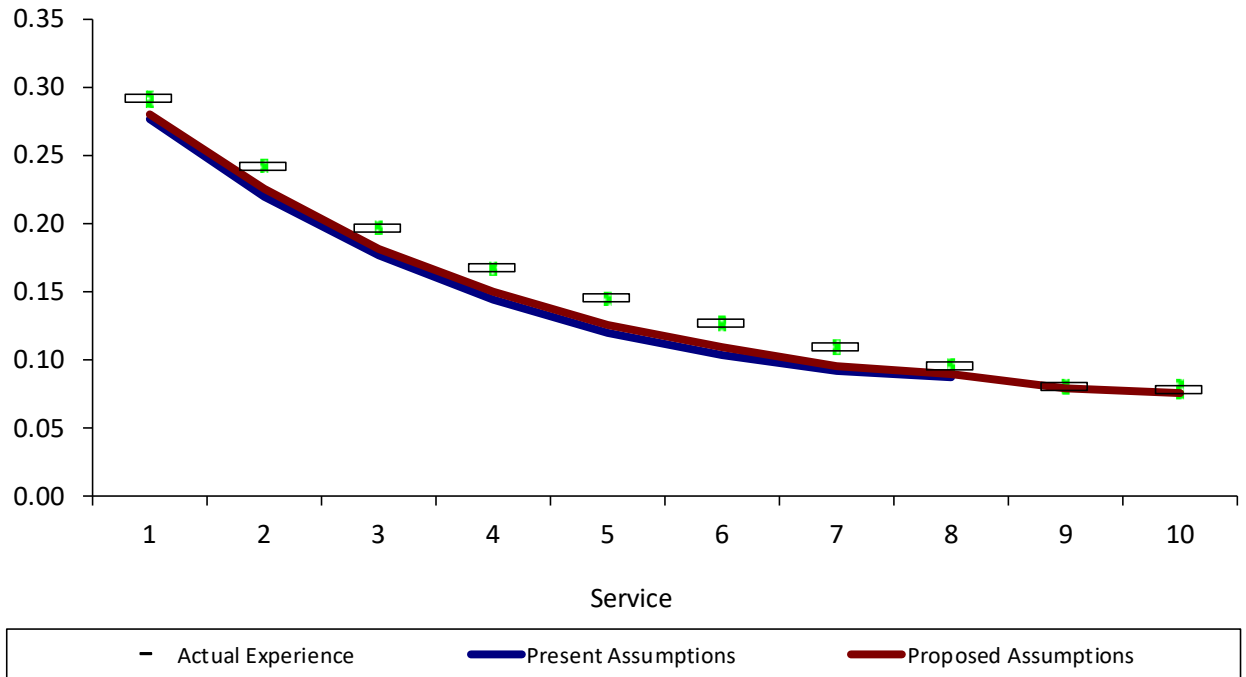
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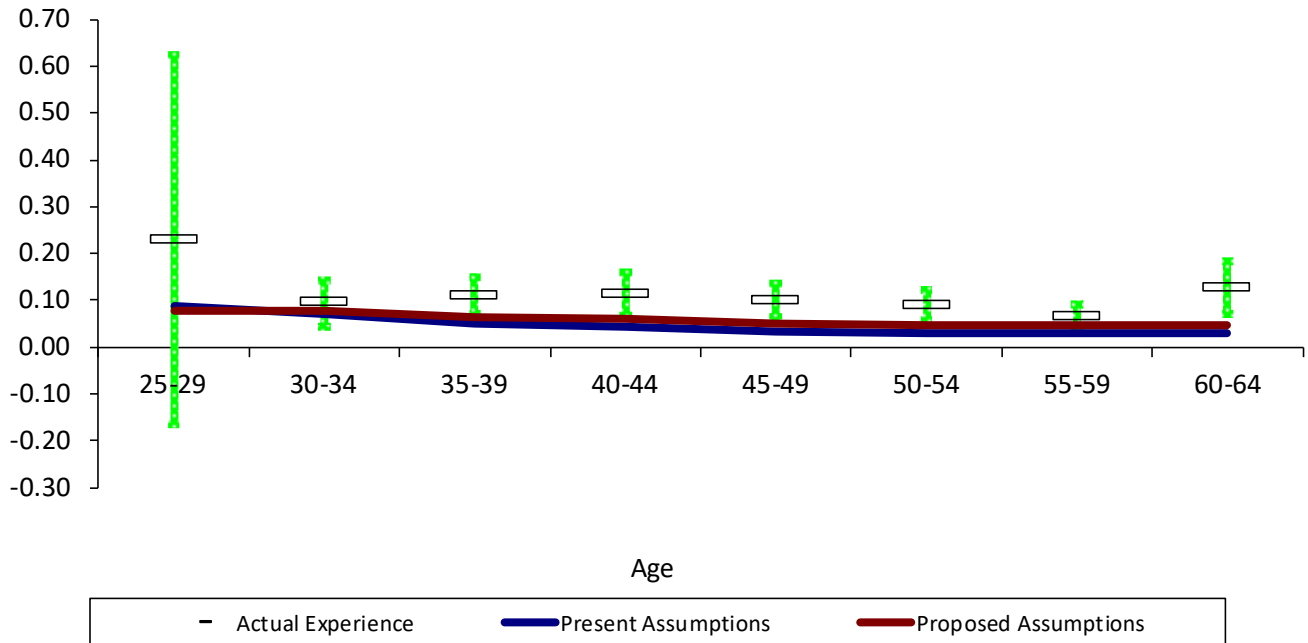
SLEP Withdrawal Experience

There were 6 withdrawals and 78 years of exposure included in the service-based withdrawal investigation for SLEP members with less than 7 years of service. Currently, the threshold for the Tier 1 service-based table is 7 years. The proposed rates recommend the same threshold and slightly higher rates of withdrawal.

Tier 1 SLEP Service-Based Withdrawals

Service Index	Withdrawals	Exposure	Actual Rates	Sample Rates Present	Sample Rates Proposed	Expected Withdrawals Present	Expected Withdrawals Proposed
1	1	4	0.2500	0.1833	0.1900	0.7	0.8
2	3	19	0.1579	0.1100	0.1250	2.1	2.4
3	1	15	0.0667	0.0800	0.0860	1.2	1.3
4	-	11	0.0000	0.0800	0.0860	0.9	0.9
5	1	8	0.1250	0.0650	0.0700	0.5	0.6
6	-	7	0.0000	0.0570	0.0650	0.4	0.5
7	-	14	0.0000	0.0410	0.0600	0.6	0.8
8	3	11	0.2727			-	-
9	-	11	0.0000			-	-
10	5	46	0.1087			-	-
11	4	121	0.0331			-	-
12	10	242	0.0413			-	-
13	10	372	0.0269			-	-
14	10	426	0.0235			-	-
15	12	445	0.0270			-	-
16	10	417	0.0240			-	-
17	7	430	0.0163			-	-
18	7	418	0.0167			-	-
19	6	392	0.0153			-	-
20	7	320	0.0219			-	-
21	14	246	0.0569			-	-
22	11	233	0.0472			-	-
23	7	218	0.0321			-	-
24	4	203	0.0197			-	-
25	11	155	0.0710			-	-
26	1	118	0.0085			-	-
27	5	70	0.0714			-	-
28	6	35	0.1714			-	-
29	1	17	0.0588			-	-
30 & over	3	11	0.2727			-	-
Totals (Less Than or Equal to 7)	6	78	0.0769	0.0821	0.0936	6.4	7.3

	Actual	Present	Proposed
Current	0.0769	0.0821	0.0936
Previous Investigation Results	0.1014	0.0740	0.0861
2014-2016	0.0735	0.0684	0.0709
2011-2013	0.0581	0.0656	0.6170

SLEP Withdrawal Experience

There were 474 withdrawals and 3,952 years of exposure included in the service-based withdrawal investigation for SLEP members with less than 10 years of service. Currently, the threshold for the Tier 2 service-based table is 7 years. The proposed rates recommend an increase in the threshold to 10 years and slightly higher rates of withdrawal.

Tier 2 SLEP Service-Based Withdrawals

Service Index	Withdrawals	Exposure	Actual Rates	Sample Rates Present	Sample Rates Proposed	Expected Withdrawals Present	Expected Withdrawals Proposed
1	89	424	0.2099	0.1833	0.1900	78	81
2	133	791	0.1681	0.1100	0.1250	87	99
3	69	686	0.1006	0.0800	0.0860	55	59
4	67	621	0.1079	0.0800	0.0860	50	53
5	45	516	0.0872	0.0650	0.0700	34	36
6	43	475	0.0905	0.0570	0.0650	27	31
7	28	439	0.0638	0.0410	0.0600	18	26
8	28	402	0.0697			-	-
9	27	381	0.0709			-	-
10	16	273	0.0586			-	-
11	11	161	0.0683			-	-
12	6	77	0.0779			-	-
13	2	37	0.0541			-	-
14	-	34	0.0000			-	-
15	-	25	0.0000			-	-
16	-	20	0.0000			-	-
17	-	14	0.0000			-	-
18	-	9	0.0000			-	-
19	1	10	0.1000			-	-
20	1	8	0.1250			-	-
21	-	6	0.0000			-	-
22	-	3	0.0000			-	-
23	-	3	0.0000			-	-
24	-	2	0.0000			-	-
25	-	2	0.0000			-	-
26	-	-	N\A			-	-
27	-	-	N\A			-	-
28	-	-	N\A			-	-
29	-	-	N\A			-	-
30 & over	-	-	N\A			-	-
Totals (Less Than or Equal to 7)	474	3,952	0.1199	0.0883	0.0974	349	385

	Actual	Present	Proposed
Current	0.1199	0.0883	0.0974
Previous Investigation Results	0.1014	0.0740	0.0861
2014-2016	0.0735	0.0684	0.0709
2011-2013	0.0581	0.0656	0.6170

SLEP Withdrawal Experience
($ amounts below are scaled by a factor of $100,000)

There were $698 in liability withdrawn during the experience study period and $23,612 in liability that was exposed to being withdrawn included in the age-based withdrawal investigation for members with 7 or more years of service. Age-based withdrawal was found to be more highly correlated with the liability weighted rates and therefore the proposed rates were increased to be closer to these rates.

Tier 1 SLEP Age-Based Withdrawals
With More Than 7 Years of Service

Age	Withdrawals	Exposure	Actual Rates Weighted by		Sample Rates*		Expected Withdrawals	
			Population	Liability	Present	Proposed	Present	Proposed
25-29	-	-	N\A	N/A	0.0410	0.0400	-	-
30-34	5	164	0.0411	0.0274	0.0350	0.0330	5	5
35-39	75	3,087	0.0271	0.0241	0.0175	0.0250	57	76
40-44	130	6,590	0.0242	0.0198	0.0150	0.0200	101	135
45-49	382	11,080	0.0339	0.0345	0.0150	0.0200	166	222
50-54	78	1,902	0.0382	0.0410	0.0150	0.0200	29	38
55-59	29	788	0.0270	0.0366	0.0150	0.0200	12	16
Totals	698	23,612	0.0299	0.0296	0.0157	0.0208	370	492

	Actual	Liability		Proposed
Current	0.0299	0.0296		0.0208
Previous Investigation Results	0.0268	0.0209		0.0179
2014-2016	0.0163	0.0130		0.0142
2011-2013	0.0157	0.0116		0.0158

* *Sample rates are taken from midpoint of age group.*

SLEP Withdrawal Experience
($ amounts below are scaled by a factor of $100,000)

There were $86.8 in liability withdrawn during the experience study period and $1,661.3 in liability that was exposed to being withdrawn included in the age-based withdrawal investigation for members with 7 or more years of service. Age based withdrawal was found to be more highly correlated with the liability weighted rates and therefore the proposed rates were increased to be closer to these rates.

Tier 2 SLEP Age-Based Withdrawals
With More Than 10 Years of Service

Age	Withdrawals	Exposure	Actual Rates Weighted by		Sample Rates*		Expected Withdrawals	
			Population	Liability	Present	Proposed	Present	Proposed
25-29	3.6	23.4	0.1526	0.1526	0.0410	0.0600	0.9	1.2
30-34	28.9	386.7	0.0747	0.0747	0.0350	0.0400	12.6	15.1
35-39	22.1	510.7	0.0432	0.0432	0.0175	0.0250	9.9	13.7
40-44	14.2	423.2	0.0334	0.0334	0.0150	0.0240	6.5	10.2
45-49	13.7	227.6	0.0603	0.0603	0.0150	0.0230	3.4	5.3
50-54	2.3	60.0	0.0387	0.0387	0.0150	0.0230	0.9	1.4
55-59	2.1	29.7	0.0717	0.0717	0.0150	0.0230	0.4	0.7
Totals	86.8	1,661.3	0.0610	0.0523	0.0208	0.0287	34.6	47.6

	Actual	Liability		Proposed
Current	0.0610	0.0523		0.0287
Previous Investigation Results	0.0268	0.0209		0.0179
2014-2016	0.0163	0.0130		0.0142
2011-2013	0.0157	0.0116		0.0158

*   *Sample rates are taken from midpoint of age group.*

SLEP Withdrawal Experience

Tier 1 SLEP Service-Based Withdrawals

Service

Actual Experience ─ Present Assumptions ━━ Proposed Assumptions ━━

Tier 1 SLEP Age-Based Withdrawals

Age

Actual Experience ─ Present Assumptions ━━ Proposed Assumptions ━━
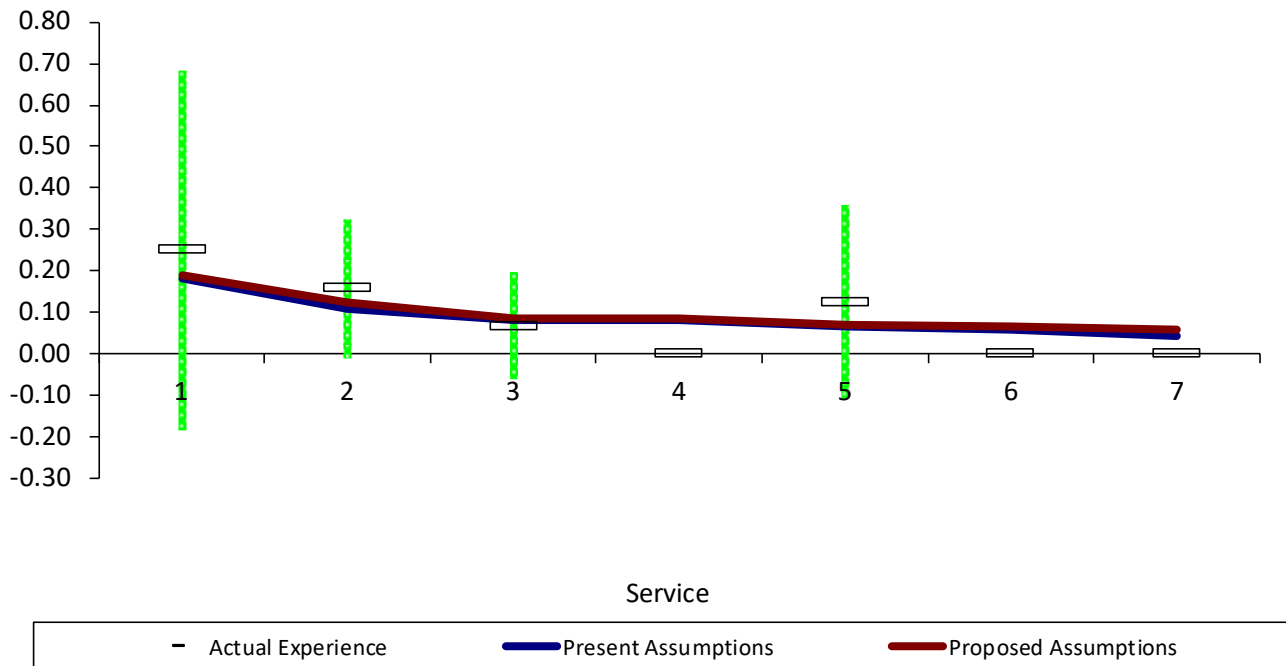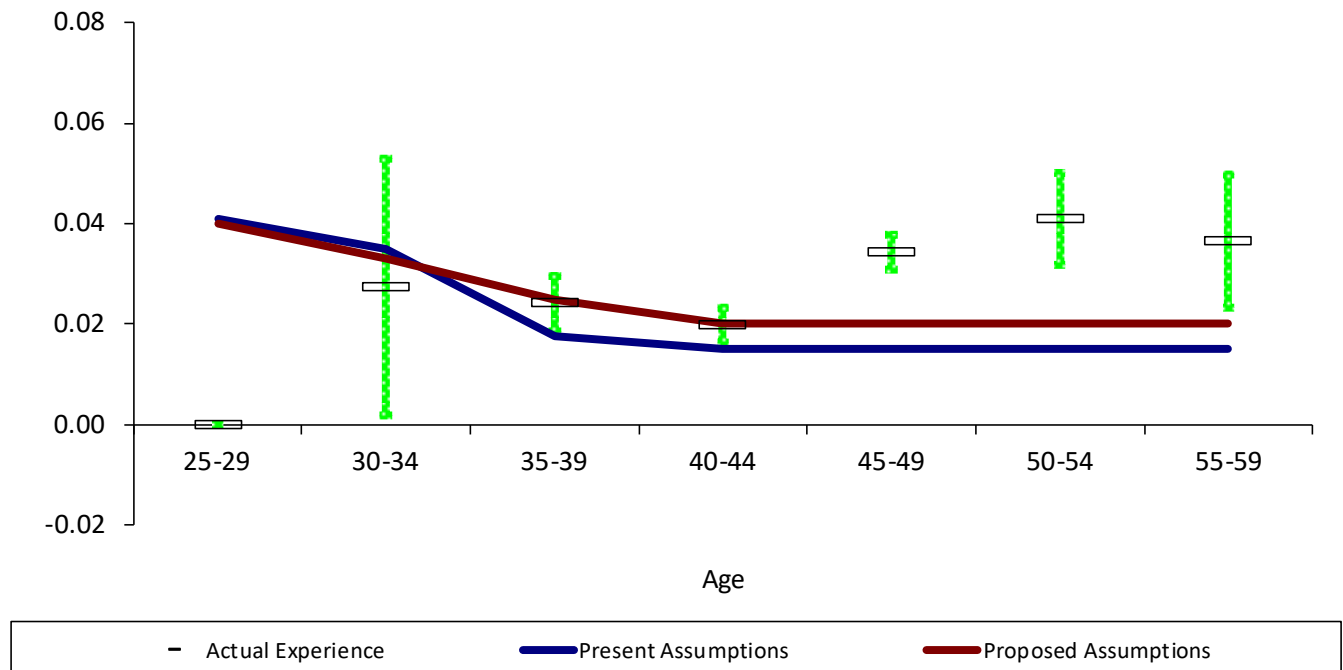
SLEP Withdrawal Experience

Tier 2 SLEP Service-Based Withdrawals
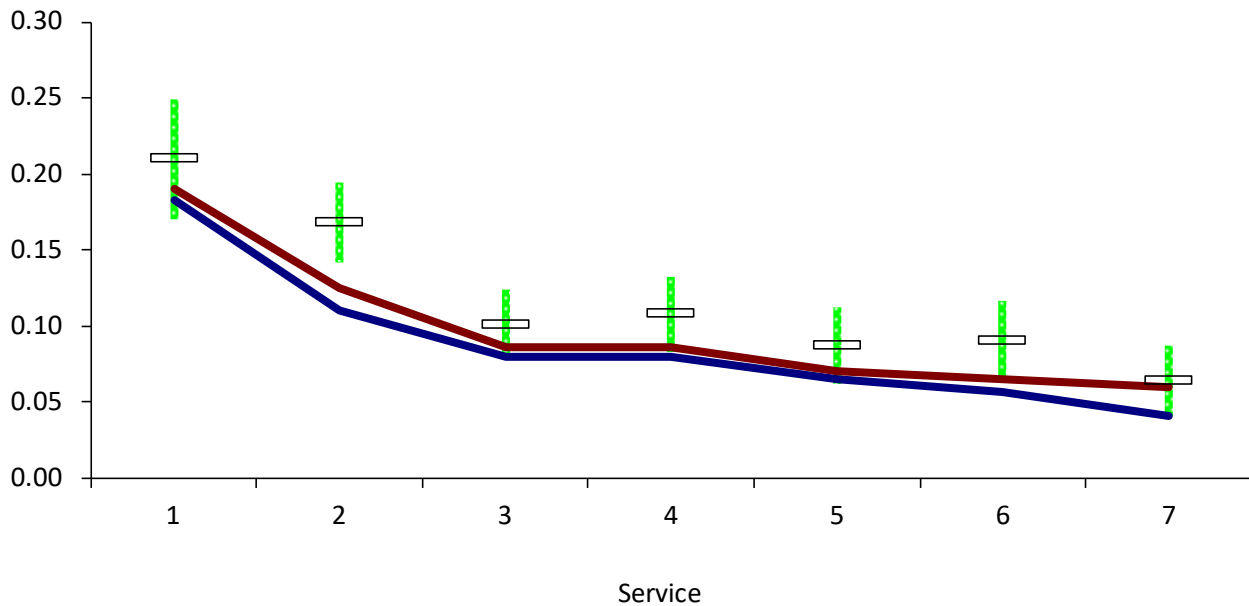
Tier 2 SLEP Age-Based Withdrawals
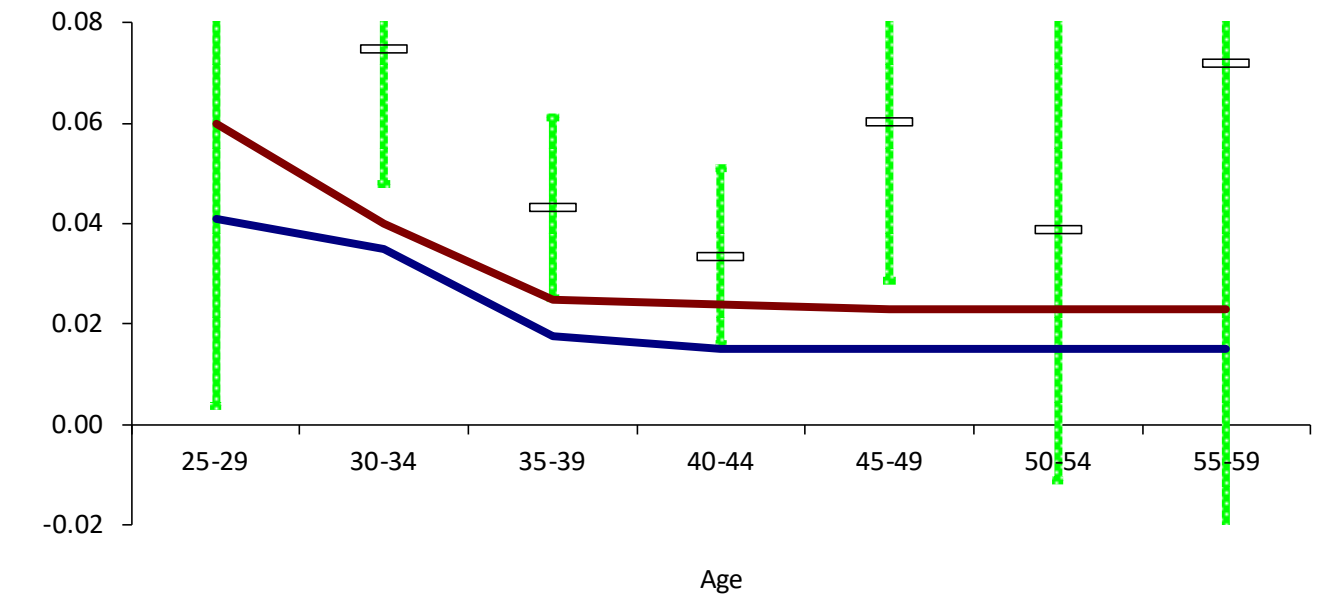
DISABILITY EXPERIENCE

Tier 1 Regular Males – Disability Retirement Experience

There were 235 temporary disability benefit claims reported for the 3-year period and 90,271 years of exposure. However, there were approximately 9 permanent disabilities. The proposed rates recommend lower rates of permanent disability.

Age	Temporary Disabilities	Exposure	Actual Rates Weighted by Population	Actual Rates Weighted by Liability	Permanent Disabilities Sample Rates* Old	Permanent Disabilities Sample Rates* New	Permanent Disabilities Actual	Permanent Disabilities Expected Present	Permanent Disabilities Expected Proposed
Under 20	-	-	0.0000	0.0000	0.0000	0.0000		-	-
20-24	-	-	0.0000	0.0000	0.0000	0.0000		-	-
25-29	-	68	0.0000	0.0000	0.0000	0.0000		-	-
30-34	2	2,049	0.0010	0.0007	0.0001	0.0000		-	-
35-39	8	7,282	0.0011	0.0012	0.0001	0.0001		1	1
40-44	19	10,564	0.0018	0.0019	0.0001	0.0001		2	1
45-49	30	11,947	0.0025	0.0027	0.0002	0.0002		3	2
50-54	46	15,229	0.0030	0.0027	0.0004	0.0003		6	4
55-59	59	17,280	0.0034	0.0027	0.0005	0.0004		9	7
60-64	56	15,043	0.0037	0.0027	0.0006	0.0005		9	8
65-69	13	7,035	0.0018	0.0012	0.0006	0.0005		4	4
70-74	2	2,467	0.0008	0.0002	0.0005	0.0004		1	1
75 & over	-	1,307	0.0000	0.0000	0.0003	0.0003		-	-
Totals	235	90,271	0.0026	0.0024	0.0004	0.0003	9	35	28

	Actual	Liability		Proposed
Current	0.0001	0.0001		0.0003
Previous Investigation Results	0.0002	0.0002		0.0003
2014-2016	0.0003	0.0003		0.0004
2011-2013	0.0004	0.0004		0.0005

Sample rates are taken from midpoint of age group.

Exposures were not available for permanent disabilities. Approximate techniques were used to develop the actual number of permanent cases. These techniques did not lend themselves to allocating the cases within age groups.

Tier 2 Regular Males – Disability Retirement Experience

There were 157 temporary disability benefit claims reported for the 3-year period and 86,917 years of exposure. However, there were approximately 4 permanent disabilities. The proposed rates recommend lower rates of permanent disability.

Age	Temporary Disabilities	Exposure	Actual Rates Weighted by		Permanent Disabilities				
					Sample Rates*		Actual	Expected	
			Population	Liability	Old	New		Present	Proposed
Under 20	-	283	0.0000	0.0000	0.0000	0.0000		-	-
20-24	3	6,027	0.0005	0.0007	0.0000	0.0000		-	-
25-29	8	13,980	0.0006	0.0009	0.0000	0.0000		-	-
30-34	8	14,381	0.0006	0.0006	0.0001	0.0000		1	1
35-39	14	10,687	0.0013	0.0010	0.0001	0.0001		1	1
40-44	14	8,140	0.0017	0.0019	0.0001	0.0001		1	1
45-49	7	6,571	0.0011	0.0009	0.0002	0.0002		2	1
50-54	15	6,563	0.0023	0.0026	0.0004	0.0003		2	2
55-59	23	7,195	0.0032	0.0043	0.0005	0.0004		4	3
60-64	43	6,506	0.0066	0.0081	0.0006	0.0005		4	3
65-69	18	3,992	0.0045	0.0069	0.0006	0.0005		2	2
70-74	3	1,760	0.0017	0.0034	0.0005	0.0004		1	1
75 & over	1	832	0.0012	0.0015	0.0003	0.0003		-	-
Totals	157	86,917	0.0018	0.0026	0.0002	0.0002	4	18	15

	Actual	Liability		Proposed
Current	0.0000	0.0000		0.0002
Previous Investigation Results	0.0002	0.0002		0.0003
2014-2016	0.0003	0.0003		0.0004
2011-2013	0.0004	0.0004		0.0005

*Sample rates are taken from midpoint of age group.

Exposures were not available for permanent disabilities. Approximate techniques were used to develop the actual number of permanent cases. These techniques did not lend themselves to allocating the cases within age groups.

Tier 1 Regular Females – Disability Retirement Experience

There were 309 temporary disability benefit claims reported for the 3-year period and 159,300 years of exposure. However, there were approximately 10 permanent disabilities. The proposed rates recommend lower rates of permanent disability.

Age	Temporary Disabilities	Exposure	Actual Rates Weighted by Population	Actual Rates Weighted by Liability	Permanent Disabilities Sample Rates* Old	Permanent Disabilities Sample Rates* New	Permanent Disabilities Actual	Permanent Disabilities Expected Present	Permanent Disabilities Expected Proposed
Under 20	-	1	0.0000	0.0000	0.0000	0.0000		-	-
20-24	-	7	0.0000	0.0000	0.0000	0.0000		-	-
25-29	-	51	0.0000	0.0000	0.0000	0.0000		-	-
30-34	3	1,960	0.0015	0.0018	0.0000	0.0000		-	-
35-39	5	8,358	0.0006	0.0010	0.0000	0.0000		-	-
40-44	12	14,077	0.0009	0.0010	0.0001	0.0000		1	1
45-49	36	18,206	0.0020	0.0023	0.0001	0.0001		2	1
50-54	57	27,655	0.0021	0.0020	0.0002	0.0001		4	3
55-59	90	35,586	0.0025	0.0023	0.0002	0.0002		8	7
60-64	83	33,814	0.0025	0.0023	0.0004	0.0003		13	10
65-69	17	14,277	0.0012	0.0007	0.0004	0.0003		6	4
70-74	2	3,869	0.0005	0.0001	0.0003	0.0002		1	1
75 & over	4	1,439	0.0028	0.0009	0.0002	0.0002		-	-
Totals	309	159,300	0.0019	0.0019	0.0002	0.0002	10	35	27

	Actual	Liability	Proposed
Current	0.0001	0.0001	0.0002
Previous Investigation Results	0.0001	0.0001	0.0002
2014-2016	0.0002	0.0002	0.0002
2011-2013	0.0002	0.0002	0.0003

*Sample rates are taken from midpoint of age group.

Exposures were not available for permanent disabilities. Approximate techniques were used to develop the actual number of permanent cases. These techniques did not lend themselves to allocating the cases within age groups.

Tier 2 Regular Females – Disability Retirement Experience

There were 199 temporary disability benefit claims reported for the 3-year period and 155,108 years of exposure. However, there were approximately 2 permanent disabilities. The proposed rates recommend lower rates of permanent disability.

Age	Temporary Disabilities	Exposure	Actual Rates Weighted by Population	Actual Rates Weighted by Liability	Permanent Disabilities Sample Rates* Old	Permanent Disabilities Sample Rates* New	Permanent Disabilities Actual	Permanent Disabilities Expected Present	Permanent Disabilities Expected Proposed
Under 20	-	266	0.0000	0.0000	0.0000	0.0000		-	-
20-24	2	7,821	0.0003	0.0005	0.0000	0.0000		-	-
25-29	11	19,351	0.0006	0.0007	0.0000	0.0000		-	-
30-34	15	21,338	0.0007	0.0007	0.0000	0.0000		-	-
35-39	23	19,452	0.0012	0.0019	0.0000	0.0000		1	1
40-44	12	19,676	0.0006	0.0007	0.0001	0.0000		1	1
45-49	18	19,056	0.0009	0.0009	0.0001	0.0001		2	1
50-54	42	18,350	0.0023	0.0026	0.0002	0.0001		3	2
55-59	34	14,744	0.0023	0.0028	0.0002	0.0002		3	3
60-64	29	9,629	0.0030	0.0036	0.0004	0.0003		4	3
65-69	9	3,729	0.0024	0.0023	0.0004	0.0003		1	1
70-74	3	1,234	0.0024	0.0020	0.0003	0.0002		-	-
75 & over	1	462	0.0022	0.0013	0.0002	0.0002		-	-
Totals	199	155,108	0.0013	0.0018	0.0001	0.0001	2	15	12

	Actual	Liability	Proposed
Current	0.0000	0.0000	0.0001
Previous Investigation Results	0.0001	0.0001	0.0002
2014-2016	0.0002	0.0002	0.0002
2011-2013	0.0002	0.0002	0.0003

*Sample rates are taken from midpoint of age group.

Exposures were not available for permanent disabilities. Approximate techniques were used to develop the actual number of permanent cases. These techniques did not lend themselves to allocating the cases within age groups.

Tier 1 SLEP Males – Disability Retirement Experience

There were 15 temporary disability benefit claims reported for the 3-year period and 5,745 years of exposure. However, there was one permanent disability. The proposed rates recommend lower rates of permanent disability.

Age	Temporary Disabilities	Exposure	Actual Rates Weighted by		Permanent Disabilities				
			Population	Liability	Sample Rates*		Actual	Expected	
					Old	New		Present	Proposed
Under 20	-	-	0.0000	0.0000	0.0000	0.0000		-	-
20-24	-	-	0.0000	0.0000	0.0000	0.0000		-	-
25-29	-	-	0.0000	0.0000	0.0001	0.0001		-	-
30-34	-	59	0.0000	0.0000	0.0001	0.0001		0.0	0.0
35-39	2	835	0.0024	0.0018	0.0002	0.0001		0.1	0.1
40-44	3	1,289	0.0023	0.0019	0.0002	0.0002		0.3	0.2
45-49	3	1,493	0.0020	0.0016	0.0003	0.0003		0.5	0.4
50-54	4	1,302	0.0031	0.0018	0.0005	0.0004		0.6	0.5
55-59	2	457	0.0044	0.0038	0.0007	0.0005		0.3	0.2
60-64	1	219	0.0046	0.0023	0.0005	0.0004		0.1	0.1
65-69	-	91	0.0000	0.0000	0.0003	0.0002		0.0	0.0
70-74	-	-	0.0000	0.0000	0.0002	0.0001		-	-
75 & over	-	-	0.0000	0.0000	0.0000	0.0000		-	-
Totals	15	5,745	0.0026	0.0019	0.0003	0.0003	1	1.9	1.6

	Actual	Liability	Proposed
Current	0.0002	0.0002	0.0003
Previous Investigation Results	0.0002	0.0002	0.0003
2014-2016	0.0001	0.0001	0.0003
2011-2013	0.0003	0.0003	0.0005

Sample rates are taken from midpoint of age group.

Exposures were not available for permanent disabilities. Approximate techniques were used to develop the actual number of permanent cases. These techniques did not lend themselves to allocating the cases within age groups.

Tier 2 SLEP Males – Disability Retirement Experience

There were 9 temporary disability benefit claims reported for the 3-year period and 4,806 years of exposure. However, there were no permanent disabilities. The proposed rates recommend lower rates of permanent disability.

| Age | Temporary Disabilities | Exposure | Actual Rates Weighted by | | Permanent Disabilities | | | | | |
| | | | Population | Liability | Sample Rates* | | Actual | Expected | |
					Old	New		Present	Proposed
Under 20	-	1	0.0000	0.0000	0.0000	0.0000		-	-
20-24	-	220	0.0000	0.0000	0.0000	0.0000		0.0	0.0
25-29	2	1,132	0.0018	0.0030	0.0001	0.0001		0.1	0.1
30-34	1	1,377	0.0007	0.0006	0.0001	0.0001		0.2	0.1
35-39	2	912	0.0022	0.0016	0.0002	0.0001		0.1	0.1
40-44	1	521	0.0019	0.0020	0.0002	0.0002		0.1	0.1
45-49	2	226	0.0088	0.0086	0.0003	0.0003		0.1	0.1
50-54	-	192	0.0000	0.0000	0.0005	0.0004		0.1	0.1
55-59	1	114	0.0088	0.0154	0.0007	0.0005		0.1	0.1
60-64	-	70	0.0000	0.0000	0.0005	0.0004		0.0	0.0
65-69	-	33	0.0000	0.0000	0.0003	0.0002		0.0	0.0
70-74	-	4	0.0000	0.0000	0.0002	0.0001		-	-
75 & over	-	4	0.0000	0.0000	0.0000	0.0000		-	-
Totals	9	4,806	0.0019	0.0025	0.0002	0.0001	-	0.8	0.6

	Actual	Liability	Proposed
Current	0.0000	0.0000	0.0001
Previous Investigation Results	0.0002	0.0002	0.0003
2014-2016	0.0001	0.0001	0.0003
2011-2013	0.0003	0.0003	0.0005

Sample rates are taken from midpoint of age group.

Exposures were not available for permanent disabilities. Approximate techniques were used to develop the actual number of permanent cases. These techniques did not lend themselves to allocating the cases within age groups.

Tier 1 SLEP Females – Disability Retirement Experience

There were 5 temporary disability benefit claims reported for the 3-year period and 950 years of exposure. However, there were no permanent disabilities. The proposed rates recommend lower rates of permanent disability.

Age	Temporary Disabilities	Exposure	Actual Rates Weighted by Population	Actual Rates Weighted by Liability	Sample Rates* Old	Sample Rates* New	Actual	Expected Present	Expected Proposed
Under 20	-	-	0.0000	0.0000	0.0001	0.0000		-	-
20-24	-	-	0.0000	0.0000	0.0001	0.0001		-	-
25-29	-	-	0.0000	0.0000	0.0003	0.0001		-	-
30-34	-	14	0.0000	0.0000	0.0004	0.0002		-	-
35-39	-	133	0.0000	0.0000	0.0005	0.0003		-	-
40-44	2	212	0.0094	0.0087	0.0008	0.0004		0.1	0.1
45-49	-	262	0.0000	0.0000	0.0011	0.0006		0.2	0.2
50-54	1	165	0.0061	0.0016	0.0017	0.0009		0.2	0.1
55-59	1	103	0.0097	0.0033	0.0023	0.0012		0.1	0.1
60-64	1	47	0.0213	0.0158	0.0016	0.0008		0.1	-
65-69	-	14	0.0000	0.0000	0.0011	0.0005		-	-
70-74	-	-	0.0000	0.0000	0.0005	0.0003		-	-
75 & over	-	-	0.0000	0.0000	0.0000	0.0000		-	-
Totals	5	950	0.0053	0.0031	0.0007	0.0005	-	0.7	0.5

	Actual	Liability	Proposed
Current	0.0000	0.0000	0.0005
Previous Investigation Results	0.0000	0.0000	0.0006
2014-2016	0.0000	0.0000	0.0010
2011-2013	0.0000	0.0000	0.0013

Sample rates are taken from midpoint of age group.

Exposures were not available for permanent disabilities. Approximate techniques were used to develop the actual number of permanent cases. These techniques did not lend themselves to allocating the cases within age groups.

Tier 2 SLEP Females – Disability Retirement Experience

There were no temporary disability benefit claims reported for the 3-year period and 700 years of exposure. However, there were no permanent disabilities. The proposed rates recommend lower rates of permanent disability.

Age	Temporary Disabilities	Exposure	Actual Rates Weighted by Population	Actual Rates Weighted by Liability	Permanent Disabilities Sample Rates* Old	Permanent Disabilities Sample Rates* New	Actual	Expected Present	Expected Proposed
Under 20	-	-	0.0000	0.0000	0.0001	0.0000		-	-
20-24	-	36	0.0000	0.0000	0.0001	0.0001		-	-
25-29	-	159	0.0000	0.0000	0.0003	0.0001		-	-
30-34	-	192	0.0000	0.0000	0.0004	0.0002		-	-
35-39	-	134	0.0000	0.0000	0.0005	0.0003		-	-
40-44	-	75	0.0000	0.0000	0.0008	0.0004		-	-
45-49	-	58	0.0000	0.0000	0.0011	0.0006		-	-
50-54	-	30	0.0000	0.0000	0.0017	0.0009		-	-
55-59	-	10	0.0000	0.0000	0.0023	0.0012		-	-
60-64	-	6	0.0000	0.0000	0.0016	0.0008		-	-
65-69	-	-	0.0000	0.0000	0.0011	0.0005		-	-
70-74	-	-	0.0000	0.0000	0.0005	0.0003		-	-
75 & over	-	-	0.0000	0.0000	0.0000	0.0000		-	-
Totals	-	700	0.0000	0.0000	0.0000	0.0000	-	-	-

	Actual	Liability	Proposed
Current	0.0000	0.0000	0.0000
Previous Investigation Results	0.0000	0.0000	0.0006
2014-2016	0.0000	0.0000	0.0010
2011-2013	0.0000	0.0000	0.0013

Sample rates are taken from midpoint of age group.

Exposures were not available for permanent disabilities. Approximate techniques were used to develop the actual number of permanent cases. These techniques did not lend themselves to allocating the cases within age groups.

PAY INCREASES

MERIT & LONGEVITY PORTION

Tier 1 Regular Members
Merit & Longevity Pay Increase Assumptions
Service Related Portion

| Service Index | Pay Increase During the Next Year | | |
| | Actual | Sample Values | |
		Present	Proposed
1	10.62 %	7.10 %	8.00 %
2	5.38 %	6.40 %	6.15 %
3	3.11 %	3.60 %	3.50 %
4	2.83 %	2.70 %	2.75 %
5	2.21 %	2.20 %	2.20 %
6	2.40 %		
7	1.91 %		
8	1.90 %		
9	1.72 %		
10	0.83 %		
11	0.85 %		
12	0.67 %		
13	0.68 %		
14	0.51 %		
15	0.75 %		
16	0.50 %		
17	0.19 %		
18	0.17 %		
19	0.11 %		
20	0.01 %		
21	0.08 %		
22	(0.06)%		
23	(0.08)%		
24	(0.17)%		
25	(0.11)%		
26	(0.55)%		
27	(0.33)%		
28	(0.32)%		
29	(0.53)%		
30	(0.48)%		
31	(0.35)%		
32	(0.55)%		
33	(0.63)%		
34	(0.79)%		
35	(0.32)%		
36	(0.33)%		
37	(0.79)%		
38	(1.37)%		
39	(1.18)%		
40	(0.20)%		

Exposure weighted average of all ages.

Tier 2 Regular Members
Merit & Longevity Pay Increase Assumptions
Service Related Portion

Service Index	Pay Increase During the Next Year		
	Actual	Sample Values	
		Present	Proposed
1	15.73 %	7.10 %	9.25 %
2	11.12 %	6.40 %	7.50 %
3	8.41 %	3.60 %	4.80 %
4	7.72 %	2.70 %	4.00 %
5	7.20 %	2.20 %	3.50 %
6	6.61 %		
7	6.16 %		
8	5.64 %		
9	5.86 %		
10	5.70 %		
11	5.97 %		
12	6.29 %		
13	5.37 %		
14	3.27 %		
15	5.49 %		
16	9.30 %		
17	0.04 %		
18	1.17 %		
19	1.69 %		
20	3.72 %		
21	2.20 %		
22	7.25 %		
23	6.55 %		
24	(0.17)%		
25	3.24 %		
26	12.59 %		
27	6.73 %		
28	(3.18)%		
29	0.73 %		
30	0.00 %		
31	0.00 %		
32	0.00 %		
33	0.00 %		
34	0.00 %		
35	0.00 %		
36	0.00 %		
37	0.00 %		
38	0.00 %		
39	0.00 %		
40	0.00 %		

Exposure weighted average of all ages.

Tier 1 Regular Members
Merit & Longevity Pay Increase Assumptions
Age Related Portion

More Than 5 Years of Service

Age Group Beginning of Year	Pay Increase During the Next Year		
		Sample Values*	
	Actual	Present	Proposed
25-29	2.24 %	2.50 %	2.50 %
30-34	1.81 %	1.70 %	1.70 %
35-39	1.49 %	1.10 %	1.20 %
40-44	1.09 %	0.90 %	0.95 %
45-49	0.83 %	0.60 %	0.65 %
50-54	0.55 %	0.40 %	0.45 %
55-59	0.39 %	0.20 %	0.25 %
60-64	0.24 %	0.10 %	0.15 %

* Sample values are selected from midpoint of age group.

Tier 2 Regular Members
Merit & Longevity Pay Increase Assumptions
Age Related Portion

More Than 5 Years of Service

Age Group Beginning of Year	Pay Increase During the Next Year		
		Sample Values*	
	Actual	Present	Proposed
25-29	2.49 %	2.50 %	2.50 %
30-34	1.84 %	1.70 %	1.70 %
35-39	1.42 %	1.10 %	1.20 %
40-44	1.66 %	0.90 %	1.10 %
45-49	1.50 %	0.60 %	0.80 %
50-54	1.30 %	0.40 %	0.60 %
55-59	1.07 %	0.20 %	0.40 %
60-64	0.36 %	0.10 %	0.15 %

* Sample values are selected from midpoint of age group.

Tier 1 SLEP Members
Merit & Longevity Pay Increase Assumptions
Service Related Portion

| Service Index | Total Pay Increase During the Next Year | | |
| | Actual | Sample Values | |
		Present	Proposed
1	(64.08)%	11.00 %	11.00 %
2	8.19 %	8.50 %	8.50 %
3	(0.24)%	4.00 %	4.00 %
4	2.98 %	3.50 %	3.50 %
5	2.50 %	3.00 %	3.00 %
6	(0.32)%	2.50 %	2.50 %
7	2.15 %	2.00 %	2.00 %
8	(3.92)%	1.50 %	1.50 %
9	4.37 %	1.25 %	1.25 %
10	1.59 %	1.00 %	1.00 %
11	1.26 %	0.75 %	0.75 %
12	0.40 %	0.75 %	0.75 %
13	0.51 %	0.50 %	0.50 %
14	0.68 %	0.50 %	0.50 %
15	0.82 %	0.50 %	0.50 %
16	0.63 %	0.50 %	0.50 %
17	0.97 %	0.50 %	0.50 %
18	0.58 %	0.50 %	0.50 %
19	1.09 %	0.50 %	0.50 %
20	1.80 %	0.50 %	0.50 %
21	2.09 %	0.50 %	0.50 %
22	0.67 %	0.50 %	0.50 %
23	2.09 %	0.50 %	0.50 %
24	1.93 %	0.50 %	0.50 %
25	3.28 %	0.50 %	0.50 %
26	2.36 %	0.50 %	0.50 %
27	2.19 %	0.50 %	0.50 %
28	1.47 %	0.50 %	0.50 %
29	3.47 %	0.50 %	0.50 %
30	1.76 %	0.50 %	0.50 %
31	4.67 %	0.50 %	0.50 %
32	2.85 %	0.50 %	0.50 %
33	5.57 %	0.50 %	0.50 %
34	4.92 %	0.50 %	0.50 %
35	(5.00)%	0.50 %	0.50 %
36	1.91 %	0.50 %	0.50 %
37	(0.82)%	0.50 %	0.50 %
38	(1.13)%	0.50 %	0.50 %
39	35.84 %	0.50 %	0.50 %
40	(3.53)%	0.50 %	0.50 %

Exposure weighted average of all ages.

Tier 2 SLEP Members
Merit & Longevity Pay Increase Assumptions
Service Related Portion

| Service Index | Total Pay Increase During the Next Year | | |
| | Actual | Sample Values | |
		Present	Proposed
1	13.99 %	11.00 %	11.00 %
2	9.76 %	8.50 %	8.50 %
3	4.88 %	4.00 %	4.00 %
4	5.05 %	3.50 %	3.50 %
5	4.12 %	3.00 %	3.00 %
6	4.38 %	2.50 %	2.50 %
7	4.34 %	2.00 %	2.00 %
8	2.63 %	1.50 %	1.50 %
9	3.63 %	1.25 %	1.25 %
10	2.35 %	1.00 %	1.00 %
11	3.78 %	0.75 %	0.75 %
12	4.41 %	0.75 %	0.75 %
13	2.84 %	0.50 %	0.50 %
14	6.48 %	0.50 %	0.50 %
15	1.15 %	0.50 %	0.50 %
16	6.16 %	0.50 %	0.50 %
17	2.99 %	0.50 %	0.50 %
18	4.39 %	0.50 %	0.50 %
19	(0.03)%	0.50 %	0.50 %
20	4.93 %	0.50 %	0.50 %
21	2.82 %	0.50 %	0.50 %
22	3.35 %	0.50 %	0.50 %
23	1.54 %	0.50 %	0.50 %
24	1.87 %	0.50 %	0.50 %
25	2.15 %	0.50 %	0.50 %
26	1.43 %	0.50 %	0.50 %
27	0.00 %	0.50 %	0.50 %
28	0.00 %	0.50 %	0.50 %
29	0.00 %	0.50 %	0.50 %
30	0.00 %	0.50 %	0.50 %
31	0.00 %	0.50 %	0.50 %
32	0.00 %	0.50 %	0.50 %
33	0.00 %	0.50 %	0.50 %
34	0.00 %	0.50 %	0.50 %
35	0.00 %	0.50 %	0.50 %
36	0.00 %	0.50 %	0.50 %
37	0.00 %	0.50 %	0.50 %
38	0.00 %	0.50 %	0.50 %
39	0.00 %	0.50 %	0.50 %
40	0.00 %	0.50 %	0.50 %

Exposure weighted average of all ages.

NORMAL AND EARLY RETIREMENT EXPERIENCE

Tier 1 Regular Males
Normal Retirement Experience
($ amounts below are scaled by a factor of $100,000)

There were $15,234 in liability due to unreduced retirements during the experience study period and $68,227 in liability that was exposed to unreduced retirement in the male Tier 1 retirement investigation. Retirement rates were found to be more highly correlated with liability weighted rates and therefore the proposed rates were adjusted slightly at various ages.

Age	Retirement	Exposure	Actual Rates Weighted by Population	Actual Rates Weighted by Liability	Sample Rates Present	Sample Rates Proposed	Expected Retirements Present	Expected Retirements Proposed
Under 55	332	332	1.0000	1.0000	N\A	N\A	-	-
55	472	1,354	0.3333	0.3488	0.3300	0.3350	447	454
56	487	1,420	0.3105	0.3431	0.2650	0.2850	376	405
57	397	1,567	0.2500	0.2532	0.1850	0.2025	290	317
58	488	1,943	0.2468	0.2509	0.2250	0.2325	437	452
59	416	2,110	0.1797	0.1972	0.2200	0.2150	464	454
60	1,559	10,417	0.1079	0.1496	0.1300	0.1350	1,354	1,406
61	1,486	9,384	0.1123	0.1584	0.1250	0.1325	1,173	1,243
62	1,899	8,599	0.1796	0.2208	0.2150	0.2175	1,849	1,870
63	1,559	7,029	0.1706	0.2218	0.2000	0.2050	1,406	1,441
64	1,025	5,927	0.1501	0.1730	0.1800	0.1775	1,067	1,052
65	1,419	5,077	0.2707	0.2795	0.2600	0.2650	1,320	1,345
66	1,308	3,651	0.3119	0.3583	0.3200	0.3300	1,168	1,205
67	828	2,323	0.2959	0.3563	0.2600	0.2850	604	662
68	456	1,710	0.2366	0.2665	0.2300	0.2400	393	410
69	362	1,429	0.2269	0.2532	0.2250	0.2325	322	332
70	317	1,104	0.2484	0.2875	0.2600	0.2675	287	295
71	215	771	0.2533	0.2794	0.2400	0.2500	185	193
72	100	504	0.1983	0.1990	0.1750	0.1800	88	91
73	80	397	0.1967	0.2010	0.2200	0.2150	87	85
74	61	305	0.2288	0.2007	0.2000	0.2000	61	61
75 & over	300	1,208	0.2556	0.2487	0.2300	0.2350	278	284
Total (55 & over)	15,234	68,227	0.1942	0.2233	0.2002	0.2060	13,656	14,057

	Actual	Liability		Proposed
Current	0.1942	0.2233		0.2060
Previous Investigation Results	0.1774	0.2009		0.2041
2014-2016	0.1773	0.2027		0.2003
2011-2013	0.1712	0.1962		0.1965

Tier 1 Regular Males
Early Retirement Experience
($ amounts below are scaled by a factor of $100,000)

There were $3,885 in liability due to reduced early retirement liability during the experience study period and $43,991 in liability that was exposed to reduced early retirement in the male Tier 1 retirement investigation. Retirement rates were found to be more highly correlated with liability weighted rates. We recommend increasing the proposed rates.

Age	Retirement	Exposure	Actual Rates Weighted by		Sample Rates		Expected Retirements	
			Population	Liability	Present	Proposed	Present	Proposed
55	946	9,154	0.0768	0.1033	0.0700	0.0750	641	687
56	906	8,976	0.0670	0.1009	0.0700	0.0750	628	673
57	593	8,592	0.0507	0.0690	0.0700	0.0750	601	644
58	676	8,749	0.0613	0.0773	0.0700	0.0750	612	656
59	764	8,521	0.0711	0.0897	0.0700	0.0750	596	639
Total	3,885	43,991	0.0654	0.0883	0.0700	0.0750	3,078	3,299

	Population	Liability	Proposed
Current	0.0654	0.0883	0.0750
Previous Investigation Results	0.0533	0.0682	0.0700
2014-2016	0.0547	0.0691	0.0710
2011-2013	0.0564	0.0741	0.0725

Tier 2 Regular Males
Normal Retirement Experience
($ amounts below are scaled by a factor of $100,000)

There were $74.2 in liability due to unreduced retirements during the experience study period and $245.1 in liability that was exposed to unreduced retirement in the male Tier 2 retirement investigation. Retirement rates were found to be more highly correlated with liability weighted rates and therefore the proposed rates were adjusted slightly at various ages.

Age	Retirement	Exposure	Actual Rates Weighted by		Sample Rates		Expected Retirements	
			Population	Liability	Present	Proposed	Present	Proposed
Under 62	-	-	N\A	N/A	N\A	N\A	-	-
62	-	-	N\A	N/A	0.3500	0.3500	-	-
63	1.2	-	N\A	N/A	0.3000	0.3000	-	-
64	-	-	N\A	N/A	0.2800	0.2800	-	-
65	-	-	N\A	N/A	0.2800	0.2800	-	-
66	-	-	N\A	N/A	0.2800	0.2800	-	-
67	15.0	51.5	0.2958	0.2920	0.3000	0.2975	15.5	15.3
68	14.8	50.7	0.3333	0.2923	0.3000	0.2975	15.2	15.1
69	12.8	37.5	0.2951	0.3424	0.2500	0.2725	9.4	10.2
70	10.6	29.6	0.3051	0.3575	0.2000	0.2400	5.9	7.1
71	4.4	15.4	0.2750	0.2867	0.2000	0.2225	3.1	3.4
72	2.9	13.8	0.2143	0.2084	0.2000	0.2025	2.8	2.8
73	2.1	11.0	0.2500	0.1877	0.1800	0.1825	2.0	2.0
74	3.6	10.6	0.2000	0.3425	0.1800	0.2200	1.9	2.3
75	0.6	6.5	0.0909	0.0920	0.1800	0.1575	1.2	1.0
76	6.1	18.3	0.2586	0.3305	0.1800	0.2175	3.3	4.0
77	-	-	N\A	N/A	0.1800	0.2175	-	-
78	-	-	N\A	N/A	0.1800	0.2175	-	-
79	-	-	N\A	N/A	0.1800	0.2175	-	-
80 & over	-	-	N\A	N/A	1.0000	1.0000	-	-
Total (62 & over)	74.2	245.1	0.2768	0.3026	0.2460	0.2579	60.3	63.2

	Actual	Liability		Proposed
Current	0.2768	0.3026		0.2579

Tier 2 Regular Males
Early Retirement Experience
($ amounts below are scaled by a factor of $100,000)

There were $57.9 in liability due to reduced early retirement liability during the experience study period and $352.3 in liability that was exposed to reduced early retirement in the male Tier 2 retirement investigation. Retirement rates were found to be more highly correlated with liability weighted rates. We recommend increasing the proposed rates.

Age	Retirement	Exposure	Actual Rates Weighted by Population	Actual Rates Weighted by Liability	Sample Rates Present	Sample Rates Proposed	Expected Retirements Present	Expected Retirements Proposed
62	8.6	89.1	0.0826	0.0960	0.1500	0.1540	13.4	13.7
63	12.1	72.1	0.1250	0.1675	0.1500	0.1540	10.8	11.1
64	9.8	63.9	0.1325	0.1536	0.1500	0.1540	9.6	9.8
65	9.7	62.2	0.1412	0.1566	0.1500	0.1540	9.3	9.6
66	17.8	65.0	0.2841	0.2731	0.1500	0.1540	9.8	10.0
Total	57.9	352.3	0.1501	0.1645	0.1500	0.1540	52.9	54.2

	Actual	Liability		Proposed
Current	0.1501	0.1645		0.1540

Rates of Normal Retirement
Tier 1 Regular Males

Legend: Actual Experience — Present Assumptions — Proposed Assumptions

Rates of Early Retirement
Tier 1 Regular Males

Legend: Actual Experience — Present Assumptions — Proposed Assumptions

Rates of Normal Retirement
Tier 2 Regular Males

Actual Experience — Present Assumptions — Proposed Assumptions

Rates of Early Retirement
Tier 2 Regular Males

Actual Experience — Present Assumptions — Proposed Assumptions
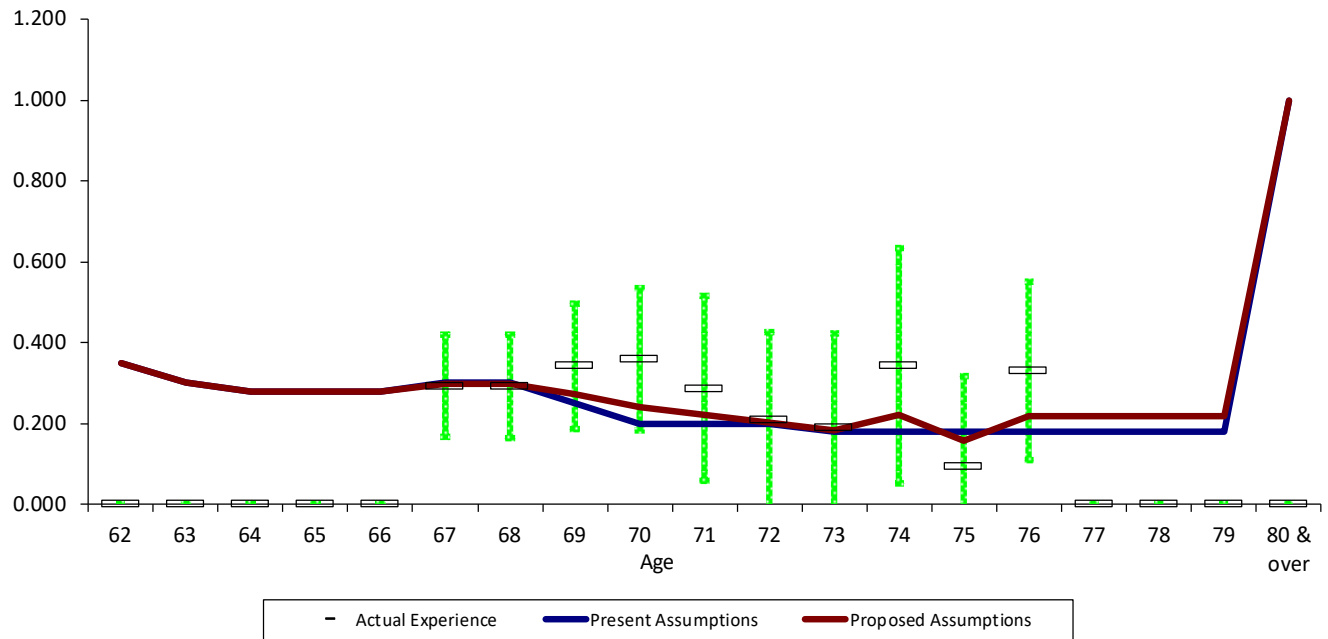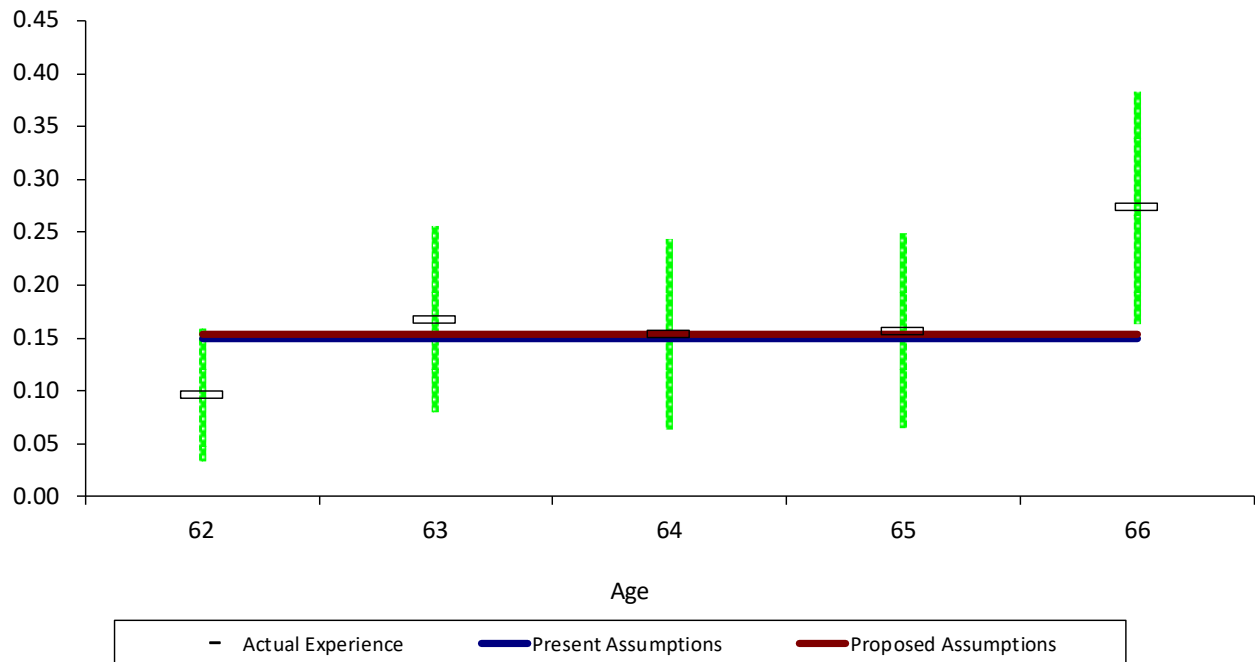
Tier 1 Regular Females
Normal Retirement Experience
($ amounts below are scaled by a factor of $100,000)

There were $17,496 in liability due to unreduced retirements during the experience study period and $84,789 in liability that was exposed to unreduced retirement in the female Tier 1 retirement investigation. Retirement rates were found to be more highly correlated with liability weighted rates and therefore the proposed rates were adjusted slightly at various ages.

Age	Retirement	Exposure	Actual Rates Weighted by Population	Actual Rates Weighted by Liability	Sample Rates Present	Sample Rates Proposed	Expected Retirements Present	Expected Retirements Proposed
Under 55	107	107	1.0000	1.0000	N\A	N\A	-	-
55	145	479	0.2688	0.3022	0.2950	0.2975	141	142
56	149	552	0.2857	0.2698	0.2025	0.2200	112	121
57	140	678	0.2143	0.2061	0.1550	0.1675	105	114
58	193	1,019	0.1805	0.1891	0.1650	0.1700	168	173
59	180	1,119	0.1786	0.1609	0.1750	0.1725	196	193
60	1,579	12,016	0.1059	0.1314	0.1150	0.1200	1,382	1,442
61	1,475	11,709	0.1059	0.1259	0.1050	0.1100	1,229	1,288
62	1,994	11,053	0.1564	0.1804	0.1750	0.1750	1,934	1,934
63	1,825	9,899	0.1655	0.1844	0.1750	0.1775	1,732	1,757
64	1,435	8,750	0.1480	0.1640	0.1600	0.1600	1,400	1,400
65	2,375	7,811	0.2848	0.3040	0.2700	0.2775	2,109	2,168
66	2,042	5,712	0.3330	0.3574	0.3200	0.3300	1,828	1,885
67	1,257	3,496	0.3175	0.3596	0.2850	0.3050	996	1,066
68	670	2,411	0.2428	0.2779	0.2300	0.2425	555	585
69	475	1,909	0.2498	0.2487	0.2500	0.2500	477	477
70	404	1,482	0.2449	0.2729	0.2550	0.2600	378	385
71	278	1,075	0.2443	0.2581	0.2300	0.2375	247	255
72	205	825	0.2249	0.2479	0.2250	0.2300	186	190
73	178	672	0.2236	0.2651	0.2100	0.2250	141	151
74	118	500	0.2265	0.2367	0.2250	0.2275	112	114
75 & over	380	1,620	0.2300	0.2347	0.2400	0.2400	389	389
Total (55 & over)	17,496	84,789	0.1864	0.2063	0.1865	0.1914	15,817	16,229

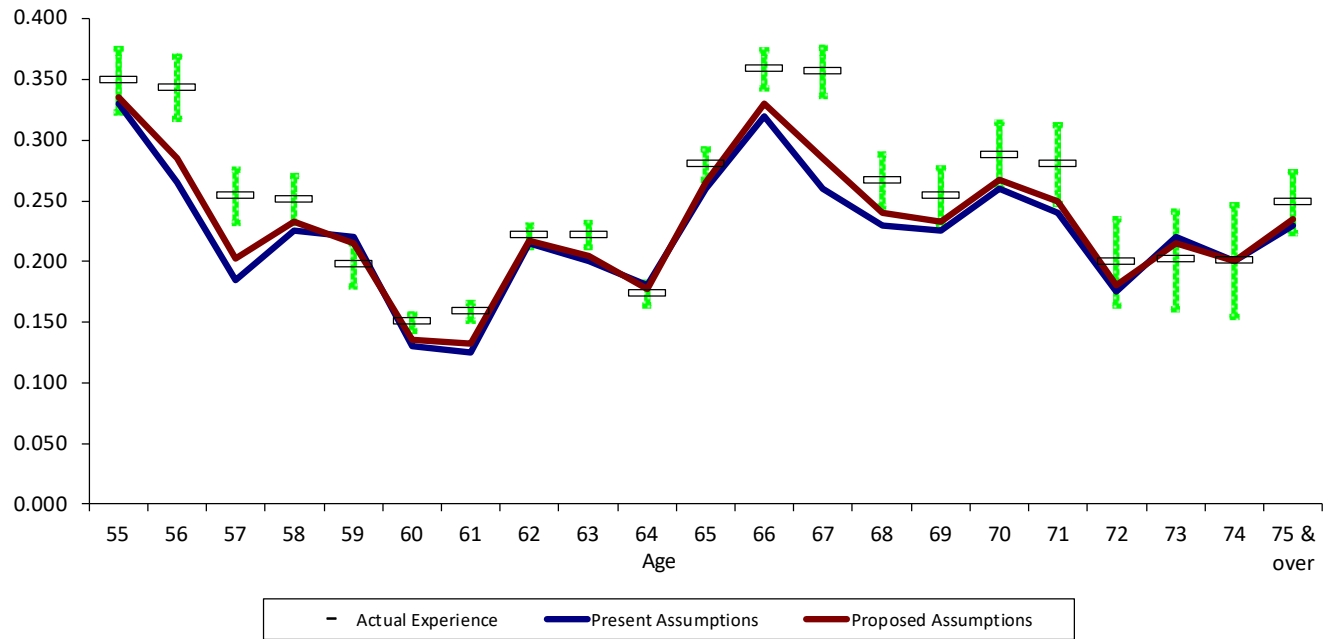|	Actual	Liability		Proposed
Current	0.1864	0.2063		0.1914
Previous Investigation Results	0.1665	0.1886		0.1852
2014-2016	0.1677	0.1831		0.1783
2011-2013	0.1551	0.1729		0.1714

Tier 1 Regular Females
Early Retirement Experience
($ amounts below are scaled by a factor of $100,000)

There were $3,648 in liability due to reduced early retirement liability during the experience study period and $49,581 in liability that was exposed to reduced early retirement in the female Tier 1 retirement investigation. Retirement rates were found to be more highly correlated with liability weighted rates. We recommend increasing the proposed rates.
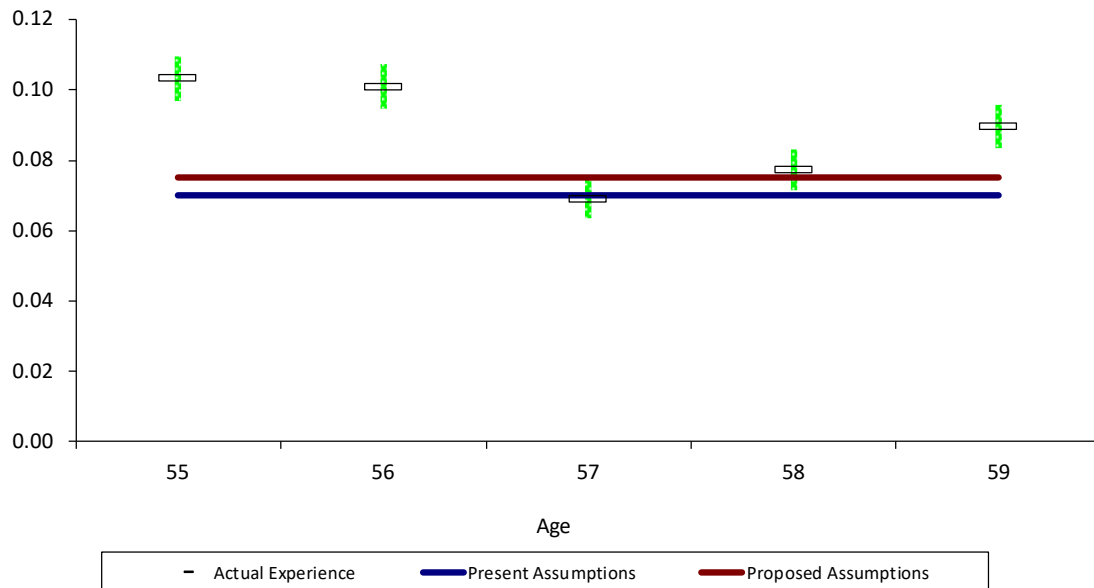
Age	Retirement	Exposure	Actual Rates Weighted by		Sample Rates		Expected Retirements	
			Population	Liability	Present	Proposed	Present	Proposed
55	768	9,245	0.0599	0.0830	0.0605	0.0640	559	592
56	734	9,480	0.0573	0.0774	0.0605	0.0640	574	607
57	648	9,955	0.0541	0.0651	0.0605	0.0640	602	637
58	692	10,281	0.0617	0.0673	0.0605	0.0640	622	658
59	807	10,619	0.0599	0.0760	0.0605	0.0640	642	680
Total	3,648	49,581	0.0586	0.0736	0.0605	0.0640	2,999	3,174

	Actual	Liability		Proposed
Current	0.0586	0.0736		0.0640
Previous Investigation Results	0.0509	0.0611		0.0605
2014-2016	0.0511	0.0612		0.0600
2011-2013	0.0443	0.0567		0.0575

Tier 2 Regular Females
Normal Retirement Experience
($ amounts below are scaled by a factor of $100,000)

There were $47.0 in liability due to unreduced retirements during the experience study period and $145.4 in liability that was exposed to unreduced retirement in the female Tier 2 retirement investigation. Retirement rates were found to be more highly correlated with liability weighted rates and therefore the proposed rates were adjusted slightly at various ages.

Age	Retirement	Exposure	Actual Rates Weighted by		Sample Rates		Expected Retirements	
			Population	Liability	Present	Proposed	Present	Proposed
Under 62	-	-	N\A	N/A	N\A	N\A	-	-
62	-	-	N\A	N/A	0.3000	0.3000	-	-
63	-	-	N\A	N/A	0.2500	0.2500	-	-
64	-	-	N\A	N/A	0.2500	0.2500	-	-
65	1.6	-	N\A	N/A	0.2500	0.2500	-	-
66	-	-	N\A	N/A	0.2000	0.2000	-	-
67	19.7	44.8	0.3699	0.4402	0.2500	0.2975	11.2	13.3
68	9.1	28.3	0.3214	0.3215	0.2500	0.2675	7.1	7.6
69	6.3	21.0	0.2667	0.2985	0.2000	0.2250	4.2	4.7
70	3.6	13.2	0.2121	0.2712	0.1800	0.2025	2.4	2.7
71	2.1	11.3	0.2414	0.1892	0.1800	0.1825	2.0	2.1
72	1.7	6.6	0.2941	0.2522	0.1800	0.1975	1.2	1.3
73	0.2	4.1	0.0909	0.0382	0.1800	0.1450	0.7	0.6
74	0.7	3.9	0.2000	0.1820	0.1800	0.1800	0.7	0.7
75	0.3	2.4	0.1429	0.1254	0.1800	0.1650	0.4	0.4
76	1.8	9.9	0.1852	0.1777	0.1800	0.1800	1.8	1.8
77	-	-	N\A	N/A	0.1800	0.1800	-	-
78	-	-	N\A	N/A	0.1800	0.1800	-	-
79	-	-	N\A	N/A	0.1800	0.1800	-	-
80 & over	-	-	N\A	N/A	1.0000	1.0000	-	-
Total (62 & over)	47.0	145.4	0.2857	0.3232	0.2180	0.2420	31.7	35.2

	Actual	Liability		Proposed
Current	0.2857	0.3232		0.2420

Tier 2 Regular Females
Early Retirement Experience
($ amounts below are scaled by a factor of $100,000)

There were $51.3 in liability due to reduced early retirement liability during the experience study period and $380.6 in liability that was exposed to reduced early retirement in the female Tier 2 retirement investigation. Retirement rates were found to be more highly correlated with liability weighted rates. We recommend increasing the proposed rates.

Age	Retirement	Exposure	Actual Rates Weighted by		Sample Rates		Expected Retirements	
			Population	Liability	Present	Proposed	Present	Proposed
62	8.3	98.8	0.0904	0.0837	0.1300	0.1310	12.8	12.9
63	8.2	92.1	0.1017	0.0890	0.1300	0.1310	12.0	12.1
64	5.9	72.1	0.1000	0.0822	0.1300	0.1310	9.4	9.4
65	12.6	62.1	0.1981	0.2026	0.1300	0.1310	8.1	8.1
66	16.4	55.5	0.2500	0.2949	0.1300	0.1310	7.2	7.3
Total	51.3	380.6	0.1320	0.1349	0.1300	0.1310	49.5	49.8

	Actual	Liability		Proposed
Current	0.1320	0.1349		0.1310

Rates of Normal Retirement
Tier 1 Regular Females

Legend: Actual Experience — Present Assumptions — Proposed Assumptions

Rates of Early Retirement
Tier 1 Regular Females

Legend: Actual Experience — Present Assumptions — Proposed Assumptions

Rates of Normal Retirement
Tier 2 Regular Females

Legend: Actual Experience, Present Assumptions, Proposed Assumptions

Rates of Early Retirement
Tier 2 Regular Females
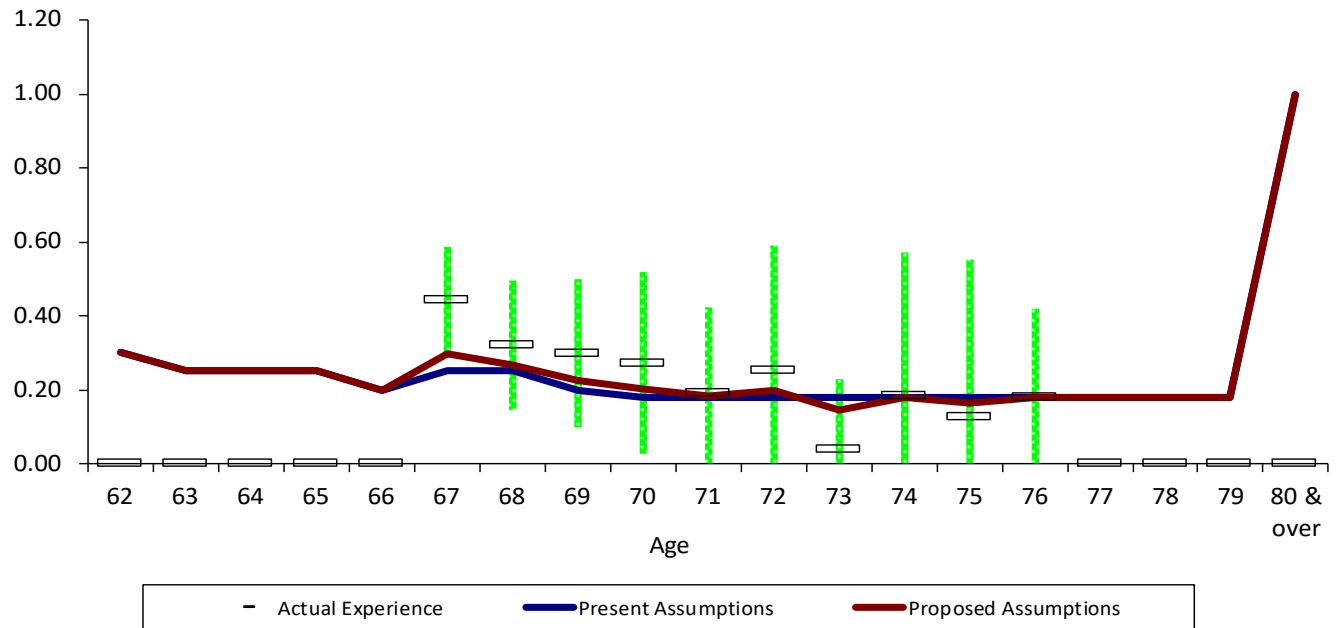
Legend: Actual Experience, Present Assumptions, Proposed Assumptions
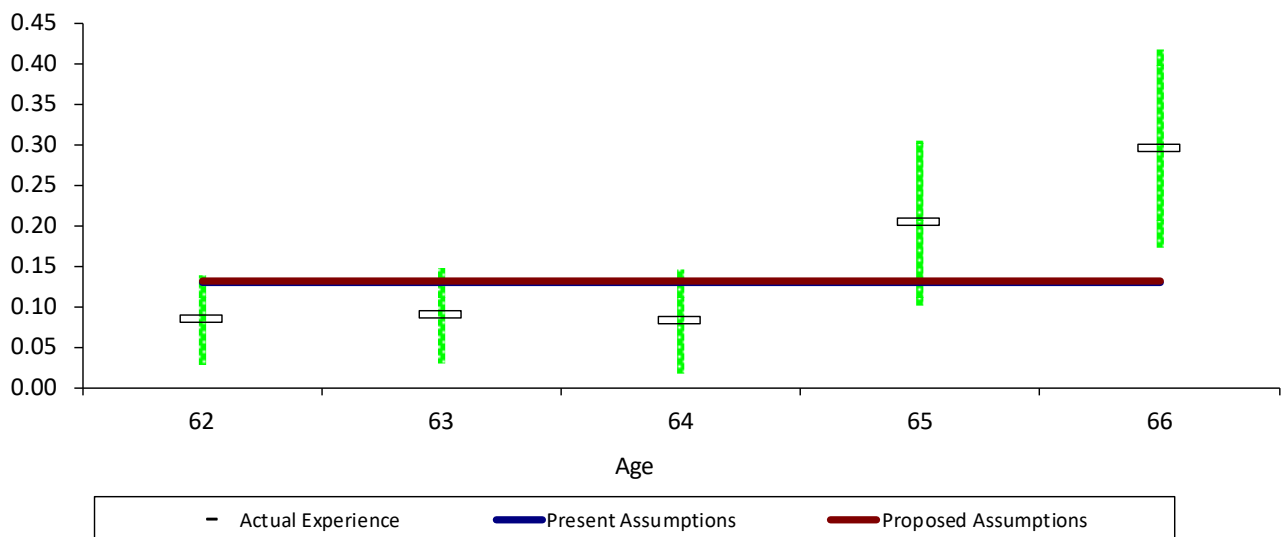
Tier 1 SLEP Members
Normal Retirement Experience
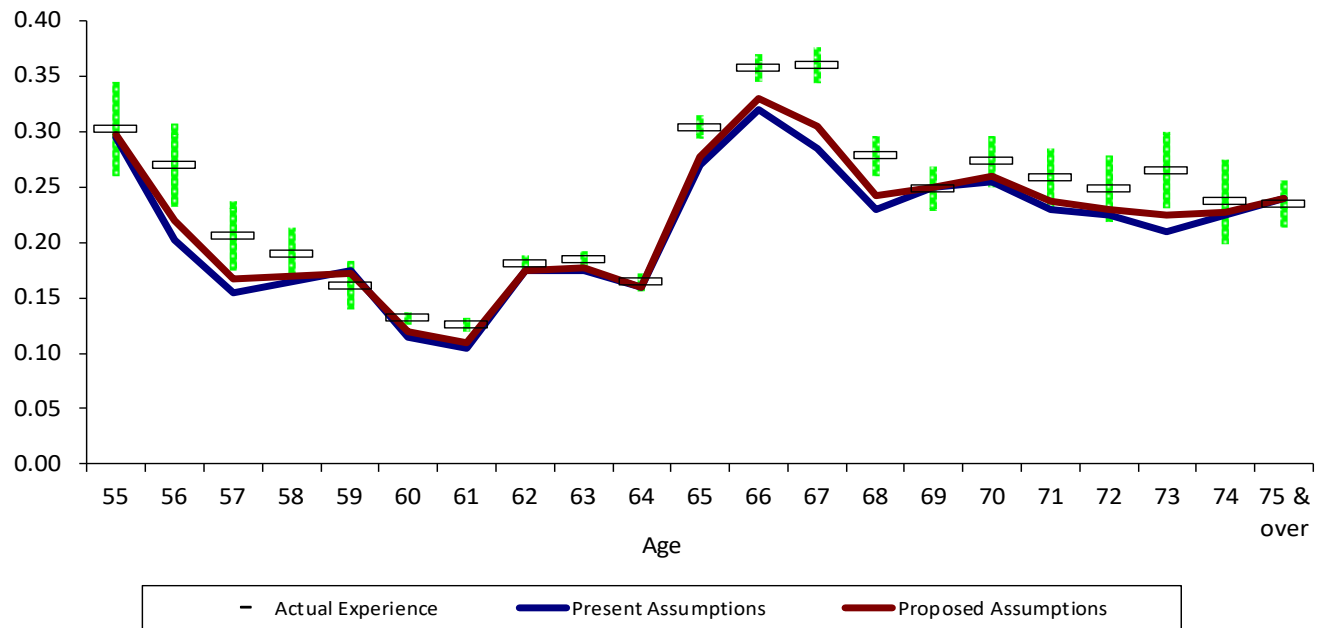### ($ amounts below are scaled by a factor of $100,000)

There were $3,679 in liability due to unreduced retirements during the experience study period and $11,803 in liability that was exposed to unreduced retirement in the SLEP Tier 1 retirement investigation. Of this $286 in liability retired after attaining 32 years of service and therefore a maximum of 80% of FAC. Retirement rates were found to be more highly correlated with liability weighted rates and therefore the proposed rates were adjusted slightly at various ages. We recommend lowering the proposed rates for members with greater than 32 years of service. We are also recommending the same table be used for both males and females.

Service	Age	Retirements	Exposure	Actual Rates Weighted by		Sample Rates		Expected Retirements	
				Population	Liability	Present	Proposed	Present	Proposed
	50	907	2,612	0.3322	0.3471	0.3000	0.3125	783.7	816.4
	51	675	1,939	0.2973	0.3484	0.3000	0.3125	581.5	605.8
	52	348	1,519	0.2022	0.2292	0.2700	0.2600	410.2	395.0
	53	392	1,212	0.3197	0.3233	0.2200	0.2450	266.6	296.8
	54	253	901	0.2661	0.2804	0.2650	0.2700	238.8	243.3
	55	171	596	0.3194	0.2869	0.2500	0.2600	149.0	154.9
	56	148	531	0.3151	0.2787	0.2450	0.2525	130.1	134.1
	57	174	468	0.3594	0.3719	0.2700	0.2950	126.3	138.0
	58	73	253	0.3077	0.2902	0.2750	0.2775	69.4	70.1
	59	131	271	0.4762	0.4825	0.2850	0.3350	77.4	90.9
	60	73	329	0.1613	0.2208	0.2100	0.2125	69.1	69.9
	61	63	296	0.1552	0.2142	0.2400	0.2325	71.1	68.8
less than	62	56	230	0.2292	0.2436	0.2800	0.2700	64.5	62.2
32 years	63	30	151	0.1765	0.1980	0.2250	0.2175	34.0	32.9
	64	25	93	0.2609	0.2622	0.2450	0.2500	22.9	23.4
	65	28	73	0.3684	0.3906	0.2100	0.2550	15.2	18.5
	66	11	74	0.1579	0.1457	0.2300	0.2100	17.0	15.6
	67	35	96	0.2381	0.3632	0.2800	0.3000	26.8	28.7
	68	40	63	0.4375	0.6267	0.3650	0.4300	23.2	27.3
	69	10	27	0.4444	0.3798	0.2950	0.1500	8.0	4.1
	70	7	22	0.3333	0.3262	1.0000	1.0000	22.3	22.3
	71	21	26	0.6000	0.8013	1.0000	1.0000	25.9	25.9
	72	3	6	0.3333	0.5920	1.0000	1.0000	5.6	5.6
	73	-	5	0.0000	0.0000	1.0000	1.0000	4.9	4.9
	74	-	3	0.0000	0.0000	1.0000	1.0000	2.5	2.5
	75 & over	5	7	0.6667	0.7072	1.0000	1.0000	6.8	6.8
	Total	3,679	11,803	0.2882	0.3117	0.2756	0.2851	3,252.8	3,364.7
more than 32 years	All	286	1,006	0.2569	0.2846	0.3260	0.3150	328.0	316.9

	Actual	Liability	Proposed
Current	0.2882	0.3117	0.2851
Previous Investigation Results	0.2577	0.3041	0.2672
2014-2016	0.2451	0.2935	0.2344
2011-2013	0.1894	0.2168	0.2034

Tier 2 SLEP Members
Normal Retirement Experience
($ amounts below are scaled by a factor of $100,000)

There were $15.34 in liability due to unreduced retirements during the experience study period and $89.38 in liability that was exposed to unreduced retirement in the SLEP Tier 2 retirement investigation. Retirement rates were found to be more highly correlated with liability weighted rates and therefore the proposed rates were adjusted slightly at various ages.
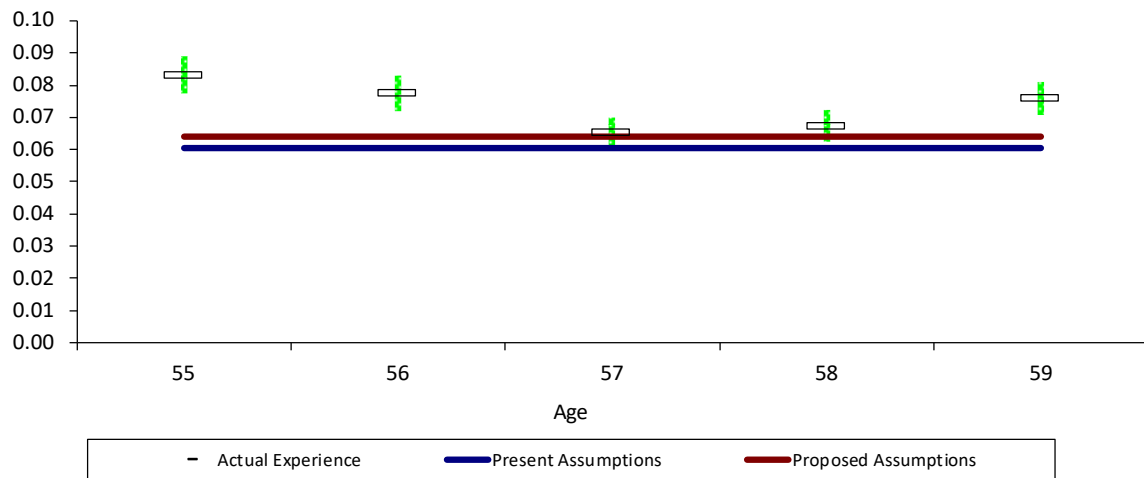
Age	Retirement	Exposure	Actual Rates Weighted by Population	Actual Rates Weighted by Liability	Sample Rates Present	Sample Rates Proposed	Expected Retirements Present	Expected Retirements Proposed
Under 55	-	-	N\A	1.0000	N\A	N\A	-	-
55	-	6.97	0.0000	0.0000	0.6000	0.4500	4.18	3.14
56	1.06	9.10	0.2000	0.1162	0.1800	0.1650	1.64	1.50
57	-	5.65	0.0000	0.0000	0.2300	0.1725	1.30	0.97
58	-	8.38	0.0000	0.0000	0.3300	0.2475	2.76	2.08
59	1.84	6.92	1.0000	0.2658	0.1300	0.1650	0.90	1.14
60	6.52	9.40	0.3333	0.6941	0.0800	0.2325	0.75	2.19
61	3.85	6.40	0.7500	0.6011	0.0800	0.2100	0.51	1.34
62	1.42	3.91	0.5000	0.3633	0.2300	0.2625	0.90	1.03
63	-	4.88	0.0000	0.0000	0.1800	0.1350	0.87	0.66
64	-	7.43	0.0000	0.0000	0.1800	0.1350	1.34	1.01
65	-	8.65	0.0000	0.0000	0.2300	0.1725	1.99	1.49
66	0.65	6.44	0.3333	0.1005	0.2300	0.1975	1.48	1.27
67	-	1.36	0.0000	0.0000	0.2300	0.1725	0.31	0.23
68	-	3.28	0.0000	0.0000	0.2300	0.1725	0.75	0.57
69	-	-	N\A	N/A	0.2300	0.1725	-	-
70	-	-	N\A	N/A	1.0000	1.0000	-	-
71	-	-	N\A	N/A	1.0000	1.0000	-	-
72	-	-	N\A	N/A	1.0000	1.0000	-	-
73	-	-	N\A	N/A	1.0000	1.0000	-	-
74	-	-	N\A	N/A	1.0000	1.0000	-	-
75 & over	-	0.61	0.0000	0.0000	1.0000	1.0000	0.61	0.61
Total (55 & over)	15.34	89.38	0.2045	0.1716	0.2270	0.2151	20.29	19.23

	Actual	Liability		Proposed
Current	0.2045	0.1716		0.2151

Tier 2 SLEP Members
Early Retirement Experience
($ amounts below are scaled by a factor of $100,000)

There were $4.24 in liability due to reduced early retirement liability during the experience study period and $92.76 in liability that was exposed to reduced early retirement in the SLEP Tier 2 retirement investigation. Retirement rates were found to be more highly correlated with liability weighted rates. We recommend lowering the proposed rates.

Age	Retirement	Exposure	Actual Rates Weighted by Population	Actual Rates Weighted by Liability	Sample Rates Present	Sample Rates Proposed	Expected Retirements Present	Expected Retirements Proposed
50	1.99	25.23	0.0909	0.0788	0.1200	0.0775	3.03	1.96
51	-	25.37	0.0000	0.0000	0.0900	0.0775	2.28	1.96
52	-	19.75	0.0000	0.0000	0.0700	0.0775	1.38	1.53
53	-	15.08	0.0000	0.0000	0.0400	0.0775	0.60	1.17
54	2.25	7.33	0.2500	0.3064	0.1200	0.0775	0.88	0.57
Total	4.24	92.76	0.0455	0.0457	0.0881	0.0775	8.17	7.19

	Actual	Liability		Proposed
Current	0.0455	0.0457		0.0775

Tier 1 SLEP Members
Normal Retirement Experience
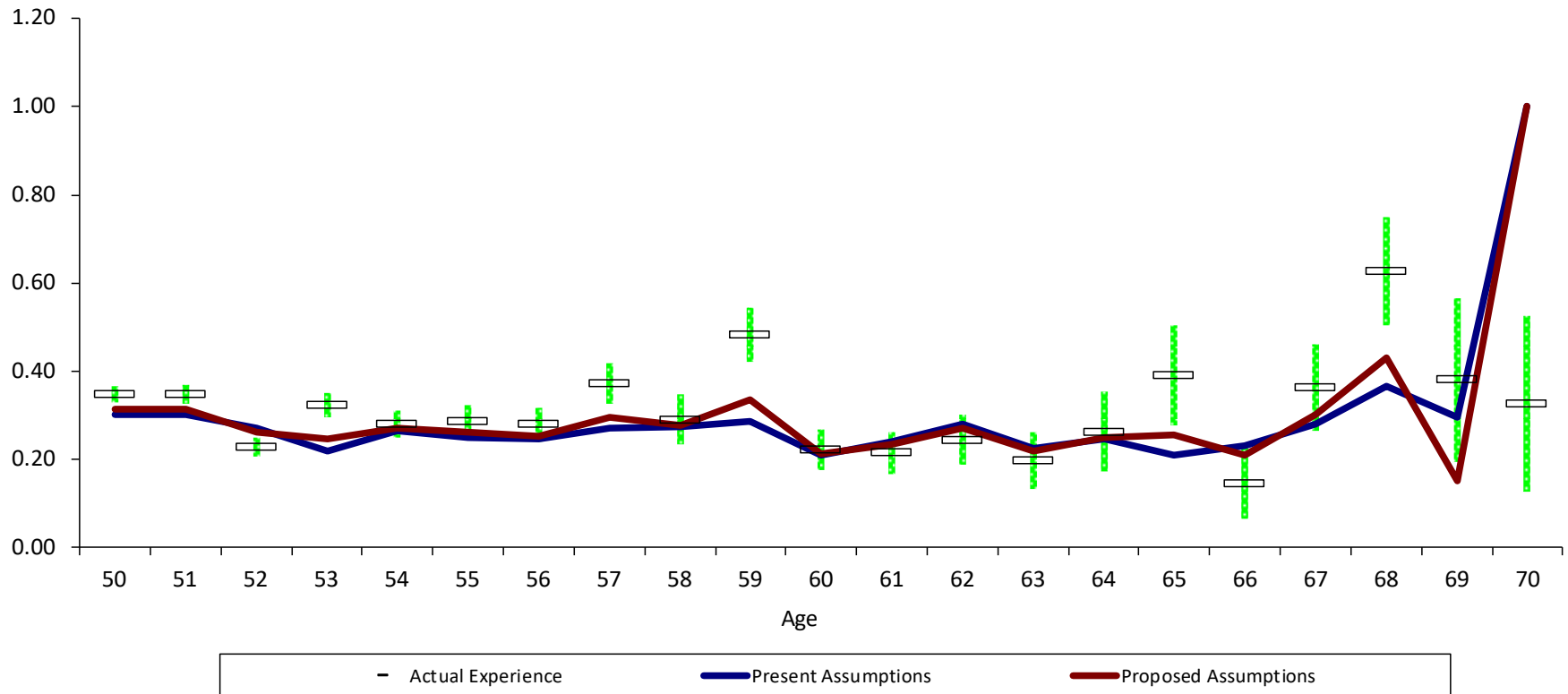
Tier 2 SLEP Members
Normal Retirement Experience

Tier 2 SLEP Members
Early Retirement Experience

Age

- Actual Experience —— Present Assumptions —— Proposed Assumptions
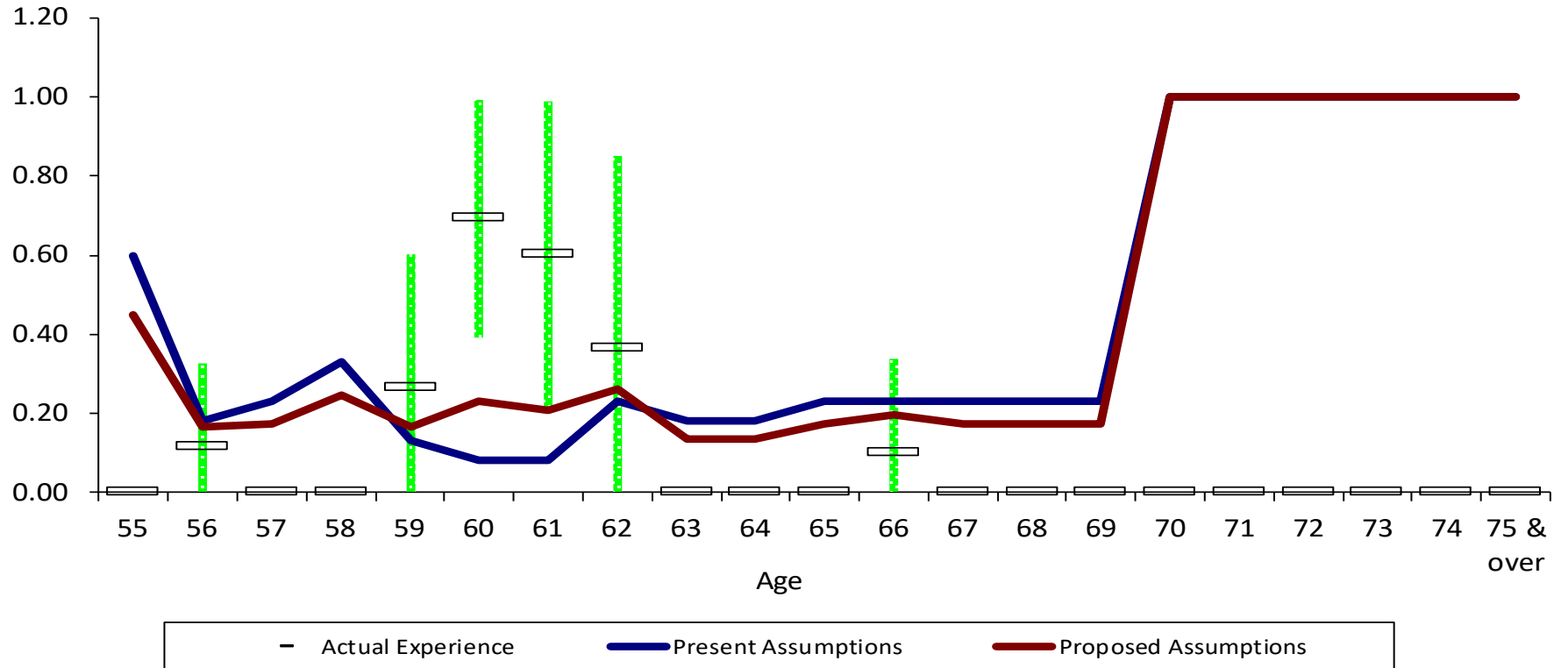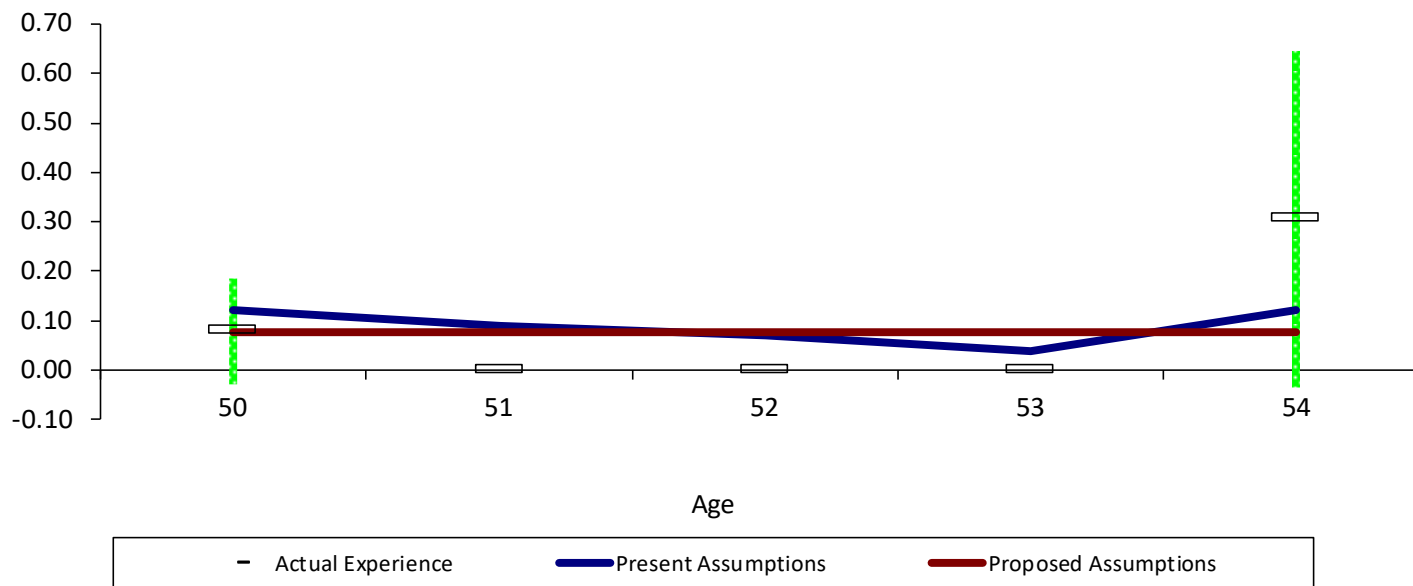
MORTALITY EXPERIENCE

Post-Retirement Mortality – Males
(Original Retirees; Non Disabled Cases)
($ amounts below are scaled by a factor of $100,000)

Due to the COVID-19 pandemic there were more deaths than expected among male retirees. Rates were evaluated on a headcount and benefit weighted basis. Rates were increased slightly from current basis to take into account plan experience, but less deaths than actual deaths are expected due to projected mortality improvement. The proposed rates were projected to the middle of the experience study period with Generational Improvement Scale MP-2021.

Age	Deaths	Exposure	Actual Rates Weighted by		Sample Rates*		Expected Deaths		Ratio of Actuals/Expecteds	
			Headcount	Benefit	Present	Proposed	Present	Proposed	Present	Proposed
50-54	1	584	0.004044	0.002195	0.007883	0.007995	5	5	25.6%	25.6%
55-59	19	3,119	0.009662	0.006112	0.010348	0.010482	33	34	57.8%	56.1%
60-64	88	7,108	0.014397	0.012430	0.012871	0.013051	91	93	97.1%	95.0%
65-69	147	9,247	0.018670	0.015931	0.016202	0.016437	149	151	98.9%	97.6%
70-74	191	7,652	0.028499	0.025001	0.024806	0.025057	186	188	102.9%	101.8%
75-79	169	4,014	0.046037	0.042208	0.041193	0.041578	161	162	105.2%	104.6%
80-84	169	2,207	0.078947	0.076546	0.071494	0.072317	154	156	109.7%	108.3%
85-89	152	1,088	0.139888	0.139813	0.122352	0.124036	127	129	119.7%	117.9%
90-94	82	385	0.220088	0.213323	0.192223	0.195182	71	72	115.7%	114.0%
95-99	29	80	0.319569	0.363230	0.270681	0.275235	20	21	144.7%	137.9%
100-104	2	6	0.425926	0.351052	0.373090	0.379901	2	2	106.3%	106.3%
105 & over	0	0	1.000000	1.000000	0.473288	0.482169	-	-	N/A	N/A
Totals	1,051	35,489	0.039977	0.029620	0.028149	0.028544	999	1,013	105.2%	103.8%

Sample values are selected from midpoint of age group.

Rates of Post-Retirement Mortality – Males
(Original Retirees; Non Disabled Cases)

Post-Retirement Mortality – Females
(Original Retirees; Non Disabled Cases)
($ amounts below are scaled by a factor of $100,000)

Due to the COVID-19 pandemic there were more deaths than expected among female retirees. Rates were evaluated on a headcount and benefit weighted basis. Rates were increased slightly from current basis to take into account plan experienc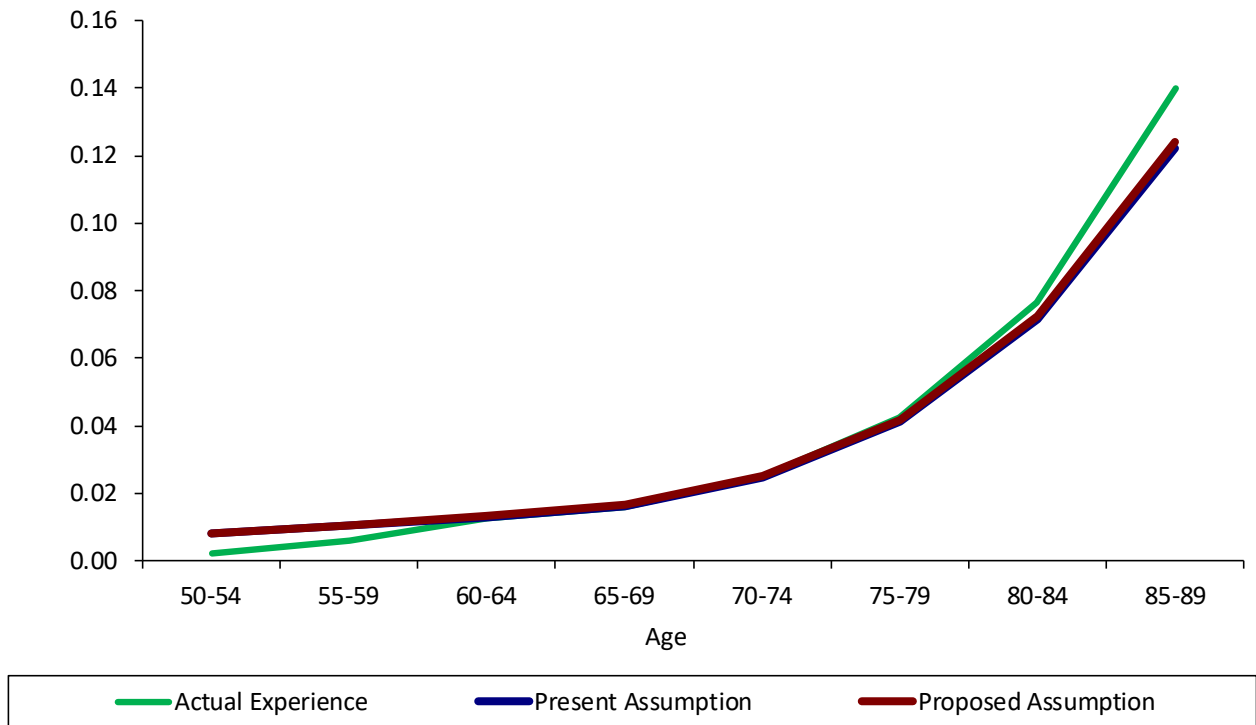e, but less deaths than actual deaths are expected due to projected mortality improvement. The proposed rates were projected to the middle of the experience study period with Generational Improvement Scale MP-2021.

Age	Deaths	Exposure	Actual Rates Weighted by Headcount	Benefit	Sample Rates* Present	Proposed	Expected Deaths Present	Proposed	Ratio of Actuals/Expecteds Present	Proposed
50-54	1	107	0.004476	0.009383	0.004476	0.004434	-	-	N/A	N/A
55-59	12	2,031	0.005430	0.006154	0.005430	0.005398	11	11	113.6%	113.6%
60-64	37	5,578	0.006306	0.006700	0.006306	0.006339	35	35	106.8%	106.8%
65-69	64	8,501	0.008317	0.007553	0.008317	0.008364	71	71	90.4%	90.4%
70-74	102	7,892	0.013895	0.012893	0.013895	0.013911	108	109	94.2%	93.4%
75-79	127	5,305	0.024969	0.024032	0.024969	0.025020	130	131	98.1%	97.3%
80-84	146	3,111	0.045968	0.047011	0.045968	0.046130	140	141	104.5%	103.7%
85-89	141	1,666	0.086077	0.084332	0.086077	0.086642	139	140	101.1%	100.4%
90-94	115	733	0.150935	0.157492	0.150935	0.152214	105	106	110.0%	108.9%
95-99	56	201	0.226790	0.280939	0.226790	0.228732	43	43	131.2%	131.2%
100-104	9	22	0.330146	0.395655	0.330146	0.333677	7	7	125.5%	125.5%
105 & over	1	1	0.438347	0.467911	0.438347	0.443479	1	1	58.0%	58.0%
Totals	812	35,149	0.028091	0.023111	0.022476	0.022618	790	795	102.8%	102.2%

Sample values are selected from midpoint of age group.

Rates of Post-Retirement Mortality – Females
(Original Retirees; Non Disabled Cases)
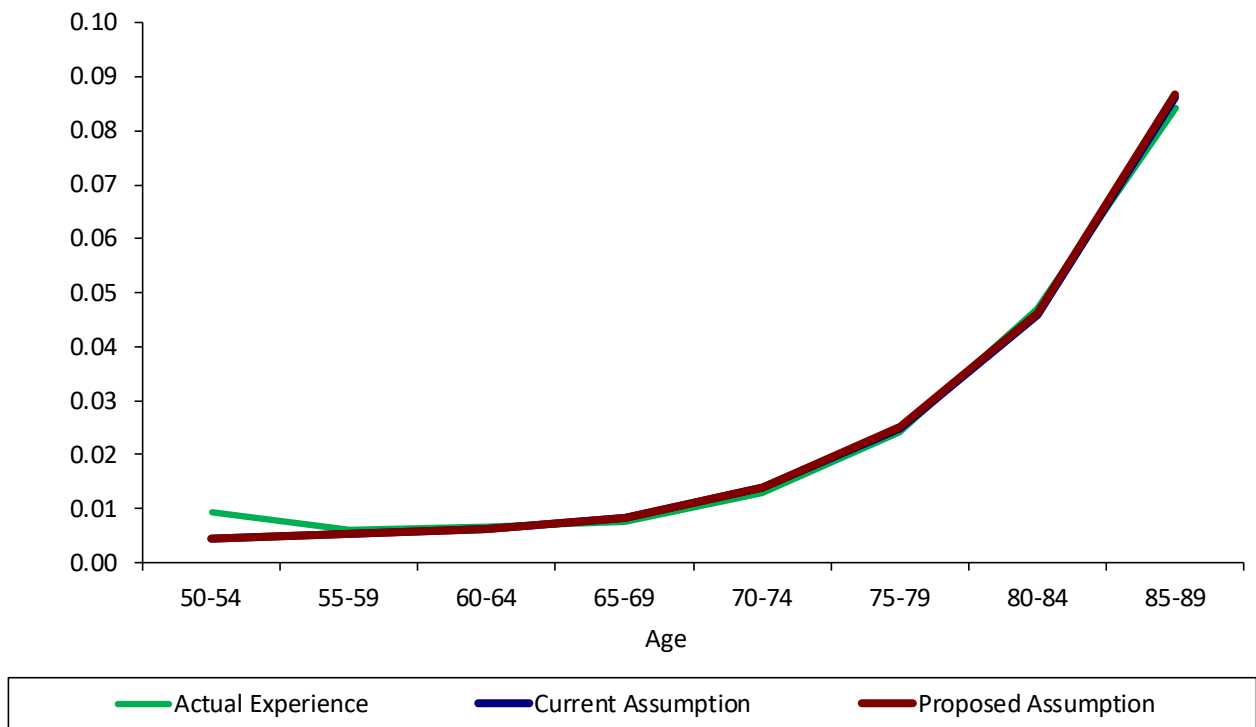
COMPLETE LISTS OF PROPOSED DECREMENT ASSUMPTIONS

Proposed Retirement Rates – Tier 1 Only

Age	Regular Male Normal	Regular Male Early	Regular Female Normal	Regular Female Early	SLEP Male Normal	SLEP Female Normal	ECO Regular Male Normal	ECO Regular Female Normal	ECO SLEP Male Normal	ECO SLEP Female Normal
50					0.3125	0.3125			0.2700	0.2700
51					0.3125	0.3125			0.2700	0.2700
52					0.2600	0.2600			0.2300	0.2300
53					0.2450	0.2450			0.1400	0.1400
54					0.2700	0.2700			0.2600	0.2600
55	0.3350	0.0750	0.2975	0.0640	0.2600	0.2600	0.2500	0.3500	0.2400	0.2400
56	0.2850	0.0750	0.2200	0.0640	0.2525	0.2525	0.2500	0.3500	0.2000	0.2000
57	0.2025	0.0750	0.1675	0.0640	0.2950	0.2950	0.1500	0.2000	0.2300	0.2300
58	0.2325	0.0750	0.1700	0.0640	0.2775	0.2775	0.1500	0.2000	0.3000	0.3000
59	0.2150	0.0750	0.1725	0.0640	0.3350	0.3350	0.1500	0.2000	0.2400	0.2400
60	0.1350		0.1200		0.2125	0.2125	0.1500	0.2000	0.2000	0.2000
61	0.1325		0.1100		0.2325	0.2325	0.1500	0.2000	0.1700	0.1700
62	0.2175		0.1750		0.2700	0.2700	0.1500	0.2000	0.2300	0.2300
63	0.2050		0.1775		0.2175	0.2175	0.1500	0.2000	0.2000	0.2000
64	0.1775		0.1600		0.2500	0.2500	0.1500	0.2000	0.2000	0.2000
65	0.2650		0.2775		0.2550	0.2550	0.1500	0.2000	0.3000	0.3000
66	0.3300		0.3300		0.2100	0.2100	0.1500	0.2000	0.2400	0.2400
67	0.2850		0.3050		0.3000	0.3000	0.1500	0.2000	0.2400	0.2400
68	0.2400		0.2425		0.4300	0.4300	0.1500	0.2000	0.2400	0.2400
69	0.2325		0.2500		0.1500	0.1500	0.1500	0.2000	0.2400	0.2400
70	0.2675		0.2600		1.0000	1.0000	0.1500	0.2000	1.0000	1.0000
71	0.2500		0.2375		1.0000	1.0000	0.1500	0.2000	1.0000	1.0000
72	0.1800		0.2300		1.0000	1.0000	0.1500	0.2000	1.0000	1.0000
73	0.2150		0.2250		1.0000	1.0000	0.1500	0.2000	1.0000	1.0000
74	0.2000		0.2275		1.0000	1.0000	0.1500	0.2000	1.0000	1.0000
75	0.2350		0.2400		1.0000	1.0000	0.1700	0.2000	1.0000	1.0000
76	0.2350		0.2400		1.0000	1.0000	0.1700	0.2000	1.0000	1.0000
77	0.2350		0.2400		1.0000	1.0000	0.1700	0.2000	1.0000	1.0000
78	0.2350		0.2400		1.0000	1.0000	0.1700	0.2000	1.0000	1.0000
79	0.2350		0.2400		1.0000	1.0000	0.1700	0.2000	1.0000	1.0000
80+	1.0000		1.0000		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Proposed Retirement Rates – Tier 2 Only

	Regular								SLEP					
	Male				Female				Male			Female		
	Normal			Early	Normal			Early	Normal		Early	Normal		Early
Age	Service Less Than 30 Years	Service Between 30 and 35 Years	Service 35 Years or More		Service Less Than 30 Years	Service Between 30 and 35 Years	Service 35 Years or More		Service Less Than 30 Years	Service 30 Years or More		Service Less Than 30 Years	Service 30 Years or More	
50											0.0775			0.0775
51											0.0775			0.0775
52											0.0775			0.0775
53											0.0775			0.0775
54											0.0775			0.0775
55									0.4500	0.8000		0.4500	0.8000	
56									0.1650	0.5500		0.1650	0.5500	
57									0.1725	0.5500		0.1725	0.5500	
58									0.2475	0.5500		0.2475	0.5500	
59									0.1650	0.5500		0.1650	0.5500	
60									0.2325	0.5500		0.2325	0.5500	
61									0.2100	0.5500		0.2100	0.5500	
62			0.7500	0.1540			0.7500	0.1310	0.2625	0.5500		0.2625	0.5500	
63			0.7500	0.1540			0.7500	0.1310	0.1350	0.5500		0.1350	0.5500	
64			0.7500	0.1540			0.7500	0.1310	0.1350	0.5500		0.1350	0.5500	
65			0.7500	0.1540			0.7500	0.1310	0.1725	0.5500		0.1725	0.5500	
66			0.7500	0.1540			0.7500	0.1310	0.1975	0.5500		0.1975	0.5500	
67	0.2975	0.5000	0.7500		0.2975	0.5000	0.7500		0.1725	0.5500		0.1725	0.5500	
68	0.2975	0.5000	0.7500		0.2675	0.5000	0.7500		0.1725	0.5500		0.1725	0.5500	
69	0.2725	0.5000	0.7500		0.2250	0.5000	0.7500		0.1725	0.5500		0.1725	0.5500	
70	0.2400	0.5000	0.7500		0.2025	0.5000	0.7500		1.0000	1.0000		1.0000	1.0000	
71	0.2225	0.5000	0.7500		0.1825	0.5000	0.7500		1.0000	1.0000		1.0000	1.0000	
72	0.2025	0.5000	0.7500		0.1975	0.5000	0.7500		1.0000	1.0000		1.0000	1.0000	
73	0.1825	0.5000	0.7500		0.1450	0.5000	0.7500		1.0000	1.0000		1.0000	1.0000	
74	0.2200	0.5000	0.7500		0.1800	0.5000	0.7500		1.0000	1.0000		1.0000	1.0000	
75	0.1575	0.5000	0.7500		0.1650	0.5000	0.7500		1.0000	1.0000		1.0000	1.0000	
76	0.2175	0.5000	0.7500		0.1800	0.5000	0.7500		1.0000	1.0000		1.0000	1.0000	
77	0.2175	0.5000	0.7500		0.1800	0.5000	0.7500		1.0000	1.0000		1.0000	1.0000	
78	0.2175	0.5000	0.7500		0.1800	0.5000	0.7500		1.0000	1.0000		1.0000	1.0000	
79	0.2175	0.5000	0.7500		0.1800	0.5000	0.7500		1.0000	1.0000		1.0000	1.0000	
80+	1.0000	1.0000	1.0000		1.0000	1.0000	1.0000		1.0000	1.0000		1.0000	1.0000	

Proposed Withdrawal Rates – Tier 1

Service	Regular Rates Less Than 8 Years of Service Male	Female	SLEP Rates Less Than 7 Years of Service Male	Female	ECO Rates Less Than 8 Years of Service Male	Female	ECO-SLEP Rates Less Than 7 Years of Service Male	Female
1	0.2490	0.2780	0.1900	0.1900	0.4000	0.4000	0.1700	0.1700
2	0.1970	0.2250	0.1250	0.1250	0.2000	0.2000	0.1000	0.1000
3	0.1570	0.1810	0.0860	0.0860	0.1500	0.1500	0.0650	0.0650
4	0.1350	0.1510	0.0860	0.0860	0.1400	0.1400	0.0620	0.0620
5	0.1140	0.1250	0.0700	0.0700	0.1300	0.1300	0.0550	0.0550
6	0.0940	0.1140	0.0650	0.0650	0.1200	0.1200	0.0460	0.0460
7	0.0825	0.1020	0.0600	0.0600	0.1100	0.1100	0.0360	0.0360
8	0.0825	0.1010			0.1000	0.1000		

Age	8 or More Years of Service Male	Female	7 or More Years of Service Male	Female	8 or More Years of Service Male	Female	7 or More Years of Service Male	Female
25 & under	0.0450	0.1010	0.0400	0.0400	0.0950	0.0675	0.0260	0.0260
26	0.0450	0.1010	0.0400	0.0400	0.0950	0.0675	0.0260	0.0260
27	0.0450	0.1010	0.0400	0.0400	0.0950	0.0675	0.0260	0.0260
28	0.0450	0.0949	0.0386	0.0386	0.0950	0.0675	0.0254	0.0254
29	0.0450	0.0888	0.0372	0.0372	0.0950	0.0675	0.0248	0.0248
30	0.0450	0.0827	0.0358	0.0358	0.0950	0.0675	0.0242	0.0242
31	0.0450	0.0766	0.0344	0.0344	0.0950	0.0675	0.0236	0.0236
32	0.0450	0.0705	0.0330	0.0330	0.0950	0.0675	0.0230	0.0230
33	0.0430	0.0671	0.0314	0.0314	0.0950	0.0675	0.0214	0.0214
34	0.0410	0.0637	0.0298	0.0298	0.0950	0.0675	0.0197	0.0197
35	0.0390	0.0603	0.0282	0.0282	0.0950	0.0675	0.0181	0.0181
36	0.0370	0.0569	0.0266	0.0266	0.0950	0.0675	0.0164	0.0164
37	0.0350	0.0535	0.0250	0.0250	0.0950	0.0675	0.0148	0.0148
38	0.0338	0.0517	0.0240	0.0240	0.0950	0.0675	0.0142	0.0142
39	0.0326	0.0499	0.0230	0.0230	0.0950	0.0675	0.0137	0.0137
40	0.0314	0.0481	0.0220	0.0220	0.0950	0.0675	0.0131	0.0131
41	0.0302	0.0463	0.0210	0.0210	0.0950	0.0675	0.0126	0.0126
42	0.0290	0.0445	0.0200	0.0200	0.0950	0.0675	0.0120	0.0120
43	0.0282	0.0428	0.0200	0.0200	0.0950	0.0675	0.0120	0.0120
44	0.0274	0.0411	0.0200	0.0200	0.0950	0.0675	0.0120	0.0120
45	0.0266	0.0394	0.0200	0.0200	0.0950	0.0675	0.0120	0.0120
46	0.0258	0.0377	0.0200	0.0200	0.0950	0.0675	0.0120	0.0120
47	0.0250	0.0360	0.0200	0.0200	0.0950	0.0675	0.0120	0.0120
48	0.0241	0.0353	0.0200	0.0200	0.0950	0.0675	0.0120	0.0120
49	0.0232	0.0346	0.0200	0.0200	0.0950	0.0675	0.0120	0.0120
50	0.0223	0.0339	0.0200	0.0200	0.0950	0.0675	0.0120	0.0120
51	0.0214	0.0332	0.0200	0.0200	0.0950	0.0675	0.0120	0.0120
52	0.0205	0.0325	0.0200	0.0200	0.0950	0.0675	0.0120	0.0120
53	0.0205	0.0325	0.0200	0.0200	0.0950	0.0675	0.0116	0.0116
54	0.0205	0.0325	0.0200	0.0200	0.0950	0.0675	0.0112	0.0112
55	0.0205	0.0325	0.0200	0.0200	0.0950	0.0675	0.0108	0.0108
56	0.0205	0.0325	0.0200	0.0200	0.0950	0.0675	0.0104	0.0104
57	0.0205	0.0325	0.0200	0.0200	0.0950	0.0675	0.0100	0.0100
58	0.0205	0.0325	0.0200	0.0200	0.0950	0.0675	0.0100	0.0100
59	0.0205	0.0325	0.0200	0.0200	0.0950	0.0675	0.0100	0.0100
60+	0.0205	0.0325	0.0200	0.0200	0.0950	0.0675	0.0100	0.0100

Proposed Withdrawal Rates – Tier 2

	Regular Rates		SLEP Rates	
	Less Than		Less Than	
	10 Years of Service		7 Years of Service	
Service	Male	Female	Male	Female
1	0.2540	0.2810	0.1900	0.1900
2	0.2050	0.2260	0.1250	0.1250
3	0.1580	0.1820	0.0860	0.0860
4	0.1360	0.1510	0.0860	0.0860
5	0.1130	0.1260	0.0700	0.0700
6	0.0920	0.1100	0.0650	0.0650
7	0.0810	0.0960	0.0600	0.0600
8	0.0780	0.0900		
9	0.0650	0.0800		
10	0.0610	0.0760		

	10 or More		7 or More	
	Years of Service		Years of Service	
Age	Male	Female	Male	Female
25 & under	0.0600	0.0760	0.0600	0.0600
26	0.0600	0.0760	0.0600	0.0600
27	0.0600	0.0760	0.0600	0.0600
28	0.0578	0.0760	0.0560	0.0560
29	0.0556	0.0760	0.0520	0.0520
30	0.0534	0.0760	0.0480	0.0480
31	0.0512	0.0760	0.0440	0.0440
32	0.0490	0.0760	0.0400	0.0400
33	0.0478	0.0738	0.0370	0.0370
34	0.0466	0.0716	0.0340	0.0340
35	0.0454	0.0694	0.0310	0.0310
36	0.0442	0.0672	0.0280	0.0280
37	0.0430	0.0650	0.0250	0.0250
38	0.0418	0.0641	0.0248	0.0248
39	0.0406	0.0632	0.0246	0.0246
40	0.0394	0.0623	0.0244	0.0244
41	0.0382	0.0614	0.0242	0.0242
42	0.0370	0.0605	0.0240	0.0240
43	0.0360	0.0585	0.0238	0.0238
44	0.0350	0.0565	0.0236	0.0236
45	0.0340	0.0545	0.0234	0.0234
46	0.0330	0.0525	0.0232	0.0232
47	0.0320	0.0505	0.0230	0.0230
48	0.0320	0.0500	0.0230	0.0230
49	0.0320	0.0495	0.0230	0.0230
50	0.0320	0.0490	0.0230	0.0230
51	0.0320	0.0485	0.0230	0.0230
52	0.0320	0.0480	0.0230	0.0230
53	0.0320	0.0480	0.0230	0.0230
54	0.0320	0.0480	0.0230	0.0230
55	0.0320	0.0480	0.0230	0.0230
56	0.0320	0.0480	0.0230	0.0230
57	0.0320	0.0480	0.0230	0.0230
58	0.0320	0.0480	0.0230	0.0230
59	0.0320	0.0480	0.0230	0.0230
60+	0.0320	0.0480	0.0230	0.0230

Proposed Disability Rates - Regular & SLEP – Tier 1 & 2

Rates of Disability For Regular and SLEP Members

Age	Regular Male	Regular Female	SLEP Male	SLEP Female	Age	Regular Male	Regular Female	SLEP Male	SLEP Female
21	0.0000	0.0000	0.0000	0.0001	51	0.0003	0.0001	0.0004	0.0008
22	0.0000	0.0000	0.0000	0.0001	52	0.0003	0.0001	0.0004	0.0009
23	0.0000	0.0000	0.0000	0.0001	53	0.0003	0.0001	0.0004	0.0009
24	0.0000	0.0000	0.0000	0.0001	54	0.0003	0.0001	0.0004	0.0010
25	0.0000	0.0000	0.0000	0.0001	55	0.0004	0.0002	0.0005	0.0011
26	0.0000	0.0000	0.0000	0.0001	56	0.0004	0.0002	0.0005	0.0011
27	0.0000	0.0000	0.0001	0.0001	57	0.0004	0.0002	0.0005	0.0012
28	0.0000	0.0000	0.0001	0.0001	58	0.0005	0.0002	0.0005	0.0011
29	0.0000	0.0000	0.0001	0.0002	59	0.0005	0.0002	0.0005	0.0010
30	0.0000	0.0000	0.0001	0.0002	60	0.0005	0.0003	0.0004	0.0010
31	0.0000	0.0000	0.0001	0.0002	61	0.0005	0.0003	0.0004	0.0009
32	0.0000	0.0000	0.0001	0.0002	62	0.0005	0.0003	0.0004	0.0008
33	0.0001	0.0000	0.0001	0.0002	63	0.0005	0.0003	0.0003	0.0008
34	0.0001	0.0000	0.0001	0.0002	64	0.0005	0.0003	0.0003	0.0007
35	0.0001	0.0000	0.0001	0.0002	65	0.0005	0.0003	0.0003	0.0006
36	0.0001	0.0000	0.0001	0.0002	66	0.0005	0.0003	0.0003	0.0006
37	0.0001	0.0000	0.0001	0.0003	67	0.0005	0.0003	0.0002	0.0005
38	0.0001	0.0000	0.0001	0.0003	68	0.0005	0.0003	0.0002	0.0005
39	0.0001	0.0000	0.0001	0.0003	69	0.0005	0.0003	0.0002	0.0004
40	0.0001	0.0000	0.0002	0.0004	70	0.0004	0.0003	0.0002	0.0004
41	0.0001	0.0000	0.0002	0.0004	71	0.0004	0.0003	0.0001	0.0003
42	0.0001	0.0000	0.0002	0.0004	72	0.0004	0.0002	0.0001	0.0003
43	0.0001	0.0001	0.0002	0.0004	73	0.0004	0.0002	0.0001	0.0002
44	0.0001	0.0001	0.0002	0.0005	74	0.0003	0.0002	0.0001	0.0002
45	0.0002	0.0001	0.0002	0.0005	75	0.0003	0.0002	0.0000	0.0001
46	0.0002	0.0001	0.0002	0.0005	76	0.0003	0.0002	0.0000	0.0001
47	0.0002	0.0001	0.0003	0.0006	77	0.0003	0.0002	0.0000	0.0000
48	0.0002	0.0001	0.0003	0.0006	78	0.0003	0.0002	0.0000	0.0000
49	0.0002	0.0001	0.0003	0.0007	79	0.0003	0.0002	0.0000	0.0000
50	0.0002	0.0001	0.0003	0.0008	80	0.0003	0.0002	0.0000	0.0000

Proposed Disability Rates - ECO & ECO SLEP – Tier 1

Rates of Disability For ECO and ECO-SLEP Members

Age	ECO		ECO-SLEP		Age	ECO		ECO-SLEP	
	Male	Female	Male	Female		Male	Female	Male	Female
21	0.0001	0.0001	0.0000	0.0000	51	0.0010	0.0007	0.0003	0.0003
22	0.0001	0.0001	0.0000	0.0000	52	0.0011	0.0008	0.0003	0.0003
23	0.0001	0.0001	0.0000	0.0000	53	0.0012	0.0008	0.0003	0.0003
24	0.0001	0.0001	0.0000	0.0000	54	0.0013	0.0009	0.0004	0.0004
25	0.0001	0.0001	0.0000	0.0000	55	0.0015	0.0010	0.0004	0.0004
26	0.0001	0.0001	0.0000	0.0000	56	0.0016	0.0010	0.0004	0.0004
27	0.0001	0.0001	0.0001	0.0001	57	0.0017	0.0011	0.0004	0.0004
28	0.0001	0.0001	0.0001	0.0001	58	0.0018	0.0013	0.0004	0.0004
29	0.0001	0.0001	0.0001	0.0001	59	0.0018	0.0015	0.0004	0.0004
30	0.0001	0.0001	0.0001	0.0001	60	0.0019	0.0017	0.0004	0.0004
31	0.0001	0.0001	0.0001	0.0001	61	0.0019	0.0019	0.0003	0.0003
32	0.0002	0.0001	0.0001	0.0001	62	0.0020	0.0020	0.0003	0.0003
33	0.0002	0.0001	0.0001	0.0001	63	0.0020	0.0020	0.0003	0.0003
34	0.0002	0.0001	0.0001	0.0001	64	0.0020	0.0020	0.0003	0.0003
35	0.0003	0.0002	0.0001	0.0001	65	0.0020	0.0020	0.0002	0.0002
36	0.0003	0.0002	0.0001	0.0001	66	0.0020	0.0020	0.0002	0.0002
37	0.0003	0.0002	0.0001	0.0001	67	0.0020	0.0020	0.0002	0.0002
38	0.0003	0.0002	0.0001	0.0001	68	0.0019	0.0019	0.0002	0.0002
39	0.0004	0.0002	0.0001	0.0001	69	0.0018	0.0018	0.0002	0.0002
40	0.0004	0.0003	0.0001	0.0001	70	0.0017	0.0017	0.0001	0.0001
41	0.0004	0.0003	0.0001	0.0001	71	0.0016	0.0016	0.0001	0.0001
42	0.0005	0.0003	0.0002	0.0002	72	0.0015	0.0015	0.0001	0.0001
43	0.0005	0.0003	0.0002	0.0002	73	0.0014	0.0014	0.0001	0.0001
44	0.0006	0.0004	0.0002	0.0002	74	0.0013	0.0013	0.0001	0.0001
45	0.0006	0.0004	0.0002	0.0002	75	0.0012	0.0012	0.0000	0.0000
46	0.0007	0.0004	0.0002	0.0002	76	0.0011	0.0011	0.0000	0.0000
47	0.0007	0.0004	0.0002	0.0002	77	0.0010	0.0010	0.0000	0.0000
48	0.0008	0.0005	0.0002	0.0002	78	0.0010	0.0010	0.0000	0.0000
49	0.0009	0.0006	0.0003	0.0003	79	0.0010	0.0010	0.0000	0.0000
50	0.0009	0.0006	0.0003	0.0003	80	0.0010	0.0010	0.0000	0.0000

Proposed Pay Increases – Regular and ECO – Tier 1

% Increase in Pay Next Year					
5 or More Years Service				Less Than 5 Years of Service	
Age	Merit & Longevity	Economic	Total	Service	% Increase
25	2.50%	2.75%	5.25%	0	8.00%
30	2.02%	2.75%	4.77%	1	6.15%
35	1.40%	2.75%	4.15%	2	3.50%
40	1.05%	2.75%	3.80%	3	2.75%
45	0.77%	2.75%	3.52%	4	2.20%
50	0.53%	2.75%	3.28%		
55	0.33%	2.75%	3.08%		
60	0.19%	2.75%	2.94%		

Proposed Pay Increases – Regular – Tier 2

	% Increase in Pay Next Year				
	5 or More Years Service			Less Than 5 Years of Service	
Age	Merit & Longevity	Economic	Total	Service	% Increase
25	2.50%	2.75%	5.25%	0	9.25%
30	2.02%	2.75%	4.77%	1	7.50%
35	1.40%	2.75%	4.15%	2	4.80%
40	1.14%	2.75%	3.89%	3	4.00%
45	0.92%	2.75%	3.67%	4	3.50%
50	0.68%	2.75%	3.43%		
55	0.48%	2.75%	3.23%		
60	0.25%	2.75%	3.00%		

Proposed Pay Increases – SLEP & ECO SLEP – Tier 1 & 2

	% Increase in Pay Next Year Years of Service		
Service	Economic	Merit and Longevity	% Total Increase
1	2.75%	11.00%	13.75%
2	2.75%	8.50%	11.25%
3	2.75%	4.00%	6.75%
4	2.75%	3.50%	6.25%
5	2.75%	3.00%	5.75%
6	2.75%	2.50%	5.25%
7	2.75%	2.00%	4.75%
8	2.75%	1.50%	4.25%
9	2.75%	1.25%	4.00%
10	2.75%	1.00%	3.75%
11	2.75%	0.75%	3.50%
12	2.75%	0.75%	3.50%
13	2.75%	0.50%	3.25%
14	2.75%	0.50%	3.25%
15	2.75%	0.50%	3.25%
16	2.75%	0.50%	3.25%
17	2.75%	0.50%	3.25%
18	2.75%	0.50%	3.25%
19	2.75%	0.50%	3.25%
20	2.75%	0.50%	3.25%
21	2.75%	0.50%	3.25%
22	2.75%	0.50%	3.25%
23	2.75%	0.50%	3.25%
24	2.75%	0.50%	3.25%
25	2.75%	0.50%	3.25%
26	2.75%	0.50%	3.25%
27	2.75%	0.50%	3.25%
28	2.75%	0.50%	3.25%
29	2.75%	0.50%	3.25%
30	2.75%	0.50%	3.25%

Proposed Pre-Retirement Mortality Rates – Tier 1 & 2

Sample Ages	% Dying Regular & ECO		% Dying SLEP & ECO SLEP		Sample Ages	% Dying Regular & ECO		% Dying SLEP & ECO SLEP	
	Male	Female	Male	Female		Male	Female	Male	Female
20	0.04%	0.01%	0.04%	0.01%	50	0.22%	0.11%	0.22%	0.11%
21	0.04%	0.01%	0.04%	0.01%	51	0.24%	0.12%	0.24%	0.12%
22	0.04%	0.01%	0.04%	0.01%	52	0.26%	0.12%	0.26%	0.12%
23	0.04%	0.01%	0.04%	0.01%	53	0.28%	0.13%	0.28%	0.13%
24	0.04%	0.01%	0.04%	0.01%	54	0.30%	0.15%	0.30%	0.15%
25	0.04%	0.01%	0.04%	0.01%	55	0.32%	0.16%	0.32%	0.16%
26	0.04%	0.01%	0.04%	0.01%	56	0.35%	0.17%	0.35%	0.17%
27	0.05%	0.01%	0.05%	0.01%	57	0.37%	0.19%	0.37%	0.19%
28	0.05%	0.02%	0.05%	0.02%	58	0.40%	0.20%	0.40%	0.20%
29	0.05%	0.02%	0.05%	0.02%	59	0.43%	0.22%	0.43%	0.22%
30	0.05%	0.02%	0.05%	0.02%	60	0.47%	0.24%	0.47%	0.24%
31	0.06%	0.02%	0.06%	0.02%	61	0.50%	0.26%	0.50%	0.26%
32	0.06%	0.02%	0.06%	0.02%	62	0.54%	0.29%	0.54%	0.29%
33	0.06%	0.03%	0.06%	0.03%	63	0.59%	0.31%	0.59%	0.31%
34	0.07%	0.03%	0.07%	0.03%	64	0.63%	0.34%	0.63%	0.34%
35	0.07%	0.03%	0.07%	0.03%	65	0.68%	0.38%	0.68%	0.38%
36	0.07%	0.03%	0.07%	0.03%	66	0.74%	0.42%	0.74%	0.42%
37	0.08%	0.04%	0.08%	0.04%	67	0.80%	0.46%	0.80%	0.46%
38	0.08%	0.04%	0.08%	0.04%	68	0.87%	0.51%	0.87%	0.51%
39	0.09%	0.04%	0.09%	0.04%	69	0.94%	0.57%	0.94%	0.57%
40	0.10%	0.05%	0.10%	0.05%	70	1.03%	0.63%	1.03%	0.63%
41	0.10%	0.05%	0.10%	0.05%	71	1.12%	0.69%	1.12%	0.69%
42	0.11%	0.06%	0.11%	0.06%	72	1.22%	0.77%	1.22%	0.77%
43	0.12%	0.06%	0.12%	0.06%	73	1.34%	0.85%	1.34%	0.85%
44	0.13%	0.07%	0.13%	0.07%	74	1.46%	0.94%	1.46%	0.94%
45	0.14%	0.07%	0.14%	0.07%	75	1.60%	1.04%	1.60%	1.04%
46	0.16%	0.08%	0.16%	0.08%	76	1.75%	1.15%	1.75%	1.15%
47	0.17%	0.08%	0.17%	0.08%	77	1.92%	1.27%	1.92%	1.27%
48	0.19%	0.09%	0.19%	0.09%	78	2.10%	1.40%	2.10%	1.40%
49	0.20%	0.10%	0.20%	0.10%	79	2.30%	1.54%	2.30%	1.54%

Life expectancy in future years is determined by a fully generational projection scale. The sample values shown are for individuals with the indicated attained ages in 2022.

Proposed Post-Retirement Mortality Rates – Tier 1 & 2

Sample Ages	% Dying Next Year				Sample Ages	% Dying Next Year			
	Non-Disabled Lives		Disabled Lives			Non-Disabled Lives		Disabled Lives	
	Males	Females	Males	Females		Males	Females	Males	Females
40	0.1037%	0.0500%	0.6450%	0.6290%	70	2.2529%	1.2651%	3.9010%	2.8620%
41	0.1112%	0.0543%	0.7000%	0.6890%	71	2.4916%	1.4141%	4.1130%	3.0390%
42	0.1210%	0.0585%	0.7630%	0.7540%	72	2.7572%	1.5800%	4.3440%	3.2390%
43	0.1307%	0.0638%	0.8340%	0.8250%	73	3.0542%	1.7673%	4.5990%	3.4640%
44	0.1426%	0.0702%	0.9160%	0.9020%	74	3.3858%	1.9769%	4.8800%	3.7180%
45	0.1890%	0.0958%	1.0070%	0.9850%	75	3.7562%	2.2110%	5.1920%	4.0030%
46	0.2506%	0.1309%	1.1090%	1.0730%	76	4.1710%	2.4727%	5.5370%	4.3220%
47	0.3326%	0.1777%	1.2210%	1.1670%	77	4.6332%	2.7653%	5.9210%	4.6780%
48	0.4417%	0.2415%	1.3420%	1.2670%	78	5.1505%	3.0962%	6.3470%	5.0750%
49	0.5864%	0.3288%	1.4700%	1.3730%	79	5.7305%	3.4686%	6.8220%	5.5170%
50	0.7787%	0.4469%	1.6050%	1.4830%	80	6.3796%	3.8921%	7.3480%	6.0070%
51	0.8154%	0.4575%	1.7120%	1.5350%	81	7.1075%	4.3752%	7.9290%	6.5500%
52	0.8543%	0.4682%	1.8180%	1.5870%	82	7.9175%	4.9253%	8.5650%	7.1500%
53	0.8942%	0.4788%	1.9210%	1.6400%	83	8.8160%	5.5541%	9.2590%	7.8110%
54	0.9331%	0.4894%	2.0200%	1.6920%	84	9.8032%	6.2712%	10.0100%	8.5360%
55	0.9731%	0.5001%	2.1140%	1.7420%	85	10.8788%	7.0894%	10.8150%	9.3310%
56	1.0130%	0.5097%	2.2010%	1.7890%	86	12.0420%	8.0226%	11.6780%	10.1630%
57	1.0519%	0.5203%	2.2800%	1.8330%	87	13.2916%	9.0749%	12.6050%	11.0140%
58	1.0908%	0.5320%	2.3550%	1.8740%	88	14.6275%	10.2495%	13.6030%	11.8780%
59	1.1297%	0.5480%	2.4280%	1.9140%	89	16.0499%	11.5423%	14.8610%	12.7570%
60	1.1696%	0.5671%	2.5030%	1.9560%	90	17.5532%	12.9425%	16.2530%	13.6650%
61	1.2107%	0.5916%	2.5840%	2.0000%	91	19.0955%	14.3927%	17.6810%	14.6170%
62	1.2539%	0.6214%	2.6770%	2.0510%	92	20.6561%	15.8664%	19.1260%	15.6350%
63	1.3014%	0.6565%	2.7850%	2.1100%	93	22.2350%	17.3581%	20.5880%	16.7400%
64	1.3532%	0.6959%	2.9080%	2.1780%	94	23.8442%	18.8796%	22.0780%	17.9550%
65	1.4126%	0.7395%	3.0440%	2.2560%	95	25.5064%	20.4554%	23.6170%	19.2980%
66	1.5368%	0.8203%	3.1930%	2.3460%	96	27.2441%	22.1131%	25.2260%	20.7840%
67	1.6826%	0.9118%	3.3530%	2.4500%	97	29.0779%	23.8804%	26.9240%	22.4440%
68	1.8490%	1.0161%	3.5240%	2.5690%	98	31.0208%	25.7765%	28.7230%	24.2260%
69	2.0390%	1.1332%	3.7060%	2.7060%	99	33.0739%	27.8076%	30.6240%	26.1350%
					100	35.2177%	29.9622%	32.6090%	28.1600%
					101	37.4069%	32.2020%	34.6360%	30.2650%
					102	39.5712%	34.4544%	36.6400%	32.3820%
					103	41.6923%	36.7016%	38.6040%	34.4940%
					104	43.7530%	38.9222%	40.5120%	36.5810%
					105	45.7402%	41.0970%	42.3520%	38.6250%
					106	47.6420%	43.2080%	44.1130%	40.6090%
					107	49.4489%	45.2402%	45.7860%	42.5190%
					108	51.1531%	47.1788%	47.3640%	44.3410%
					109	52.7504%	49.0153%	48.8430%	46.0670%
					110	54.0000%	50.7422%	50.0000%	47.6900%

Life expectancy in future years is determined by a fully generational projection scale. The sample values shown are for individuals with the indicated attained ages in 2022.