

**MISSOURI DEPARTMENT OF TRANSPORTATION AND HIGHWAY PATROL
EMPLOYEES' RETIREMENT SYSTEM (MPERS)**

**5-YEAR EXPERIENCE STUDY
JULY 1, 2004 THROUGH JUNE 30, 2009**

**ACTUARIAL INVESTIGATION REPORT
JULY 1, 2004-JUNE 30, 2009**

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March 17, 2010

The Retirement Board
Missouri Department of Transportation
and Highway Patrol Employees' Retirement System
1913 William Street
Jefferson City, Missouri 65102-1930

Ladies and Gentlemen:

Presented in this report are the results of an *actuarial investigation of experience* of the Missouri Department of Transportation and Highway Patrol Employees' Retirement System (MPERS). The investigation was conducted for the purpose of updating the actuarial assumptions used in valuing MPERS actuarial liabilities and establishing employer contribution rates.

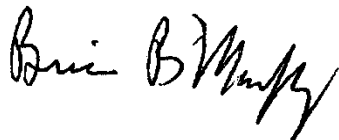
The investigation was based upon the member data furnished for annual actuarial valuations during the period *July 1, 2004 to June 30, 2009*.

The report presents specific recommendations with respect to non-economic assumptions and presents a range of potential choices for the economic assumptions. Non-economic activities (rates of turnover, retirement, etc.) tend to be generally stable and are subject to measurement by the actuary. Economic activities (inflation, investment return) tend to be unstable and are not really subject to direct measurement. We believe that the Board should select the economic assumptions from within ranges that the Board and the actuary deem reasonable.


The investigation was carried out using generally accepted actuarial principles and techniques in accordance with standards of practice prescribed by the Actuarial Standards Board. We believe that the recommended actuarial assumptions that are the result of this investigation form a reasonable basis for computing future contributions and measuring funding progress for the Missouri Department of Transportation and Highway Patrol Employees' Retirement System.

The signing actuaries are Members of the American Academy of Actuaries (M.A.A.A.) as indicated, and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

Respectfully submitted,



Brian B. Murphy, F.S.A., E.A., M.A.A.A.



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C2248

SECTION A

OVERVIEW AND ECONOMIC ASSUMPTIONS

SUMMARY OF FINDINGS

The five year period (July 1, 2004 to June 30, 2009) covered by this experience study provided sufficient data to form a basis for recommending changes in many of the assumptions used in the actuarial valuations of the Missouri Department of Transportation and Highway Patrol Employees' Retirement System. The recommended actuarial assumptions resulting from this experience study are summarized below:

- A spread between investment return and wage inflation between 4.0% and 4.5%. We estimated the effect with assumed wage inflation at 3.5% and 3.75% and assumed investment return at 7.75%, 8.00% and 8.25%.

- Non-Uniform,
 - increase the rates of ultimate withdrawal (age-based, 5 or more years of service) for males and decrease the rates for females.
 - increase the rates of select withdrawal (service-based, less than 5 years of service).
 - increase the rates of disability for males and decrease the rates for females.
 - increase the rates of normal (unreduced) retirement.
 - increase the rates of early (reduced) retirement for males and decrease the rates for females.
 - increase the margin for post-retirement mortality.
 - increase the male rates and decrease the female rates of pre-retirement mortality.
 - maintain the rates of merit and seniority pay increases (age-based).
 - add an assumption for rates of merit and seniority pay increases (service-based).

- Uniform,
 - Smooth the rates of ultimate withdrawal with a decrease in rates at younger ages and an increase in rates at older ages (age-based, 5 or more years of service).
 - increase the rates of select withdrawal (service-based, less than 5 years of service) in the first two years and decrease the rates in years 2 through 5.
 - decrease the rates of disability.
 - decrease the rates of normal (unreduced) retirement.
 - increase the margin for post-retirement mortality.
 - increase the male rates and decrease the female rates of pre-retirement mortality.
 - increase the rates of merit and seniority pay increases.

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

INTRODUCTION

Each year, as of June 30, the liabilities of the Missouri Department of Transportation and Highway Patrol Employees' Retirement System are valued. In order to perform the valuation, assumptions must be made regarding the future experience of the system with regard to the following risk areas:

- Rates of **withdrawal** of active participants.
- Rates of **disability** among active participants.
- Patterns of **salary increases** to active participants.
- Rates of **retirement** among active participants.
- Rates of **mortality** among active participants, retirees, and beneficiaries.
- Long-term rates of **investment return** to be generated by the assets of the System.

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

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

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

In recognition of this, Missouri statutes require that assumptions used to value the liabilities of the Missouri Department of Transportation and Highway Patrol Employees' Retirement System be studied in-depth every five 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 June 30, 2004 regular actuarial valuation.

SUMMARY OF DECREMENT ASSUMPTIONS

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

Experience was studied separately for Uniformed members and Non-Uniformed members. For the Non-Uniformed members, the experience was further broken down between male and female members. Male and female experience was studied in aggregate for the Uniformed group since it is over 95% male.

Rates of Withdrawals: Withdrawals from service were studied separately for members with less than five years of service and members with five or more years of service. Actual rates of separation from employment for all member groups in both categories were above assumed rates. The rates were adjusted to more closely track experience.

Disability: Observed rates of disability are lower than assumed in all groups except Non-Uniformed males. The recommended rates reduce the assumption for Uniform members and Non-Uniformed females and increase the assumption for Non-Uniformed males to more closely track experience.

Normal Retirement: Actuarial experience was below expectations for Uniformed members and Non-Uniformed females and above expectations for Non-Uniform males. Rates were adjusted accordingly.

SUMMARY OF DECREMENT ASSUMPTIONS (CONCLUDED)

Early Retirement: Experience indicated slightly less early retirements than assumed at most ages and significantly more at age 62 for males. The recommended rates were adjusted accordingly.

Mortality: Retired life mortality was higher than assumed for males and females in total. However, mortality for males 65 and older was lower than assumed. We are therefore recommending a change in the table that will provide a margin for mortality improvements at and beyond age 65. The proposed change for females does not materially change expectations.

Pay Increase Rate (Merit and Longevity Portion) was analyzed to see if the correlation with service was stronger than the correlation with age. For Uniformed members during the study period, however, the correlation was stronger by age than by service. Therefore, we recommend continuing to associate assumed pay increases with age. Rates were adjusted for experience. For Non-Uniformed members, a service based assumption for the first four years of service has been added.

In addition, rates of pay increases for Uniformed members was significantly above assumed. Further analysis indicated that the discrepancy was largely related to two years in the study period and produced a substantially different pattern of increases from the prior study. As a result we did not make as large an adjustment to the assumed increases. If the pattern of increases continues during the next 5-year period, we will make a larger adjustment.

Complete listings of all assumptions begin on page 39.

SUMMARY OF DECREMENT EXPERIENCE

Decrement Risk Area	Actual	Expected	
		Current	Proposed
<u>Withdrawal - Total</u>			
Uniform	111	99	107
Non-Uniform			
Male	1,954	1,258	1,646
Female	509	458	467
<u>Withdrawal - Service 5 & Up</u>			
Uniform	62	62	63
Non-Uniform			
Male	581	301	459
Female	234	221	210
<u>Disability</u>			
Uniform	1	4	3
Non-Uniform			
Male	68	66	68
Female	29	32	29
<u>Normal Retirement</u>			
Uniform	97	127	114
Non-Uniform			
Male	757	601	750
Female	176	154	194
<u>Early Retirement</u>			
Non-Uniform			
Male	61	65	69
Female	24	37	34
<u>Mortality - Retired Lives</u>			
Healthy Lives			
Male	843	806	746
Female	52	35	35
<u>Mortality - Active Lives</u>			
Male	32	39	41
Female	4	6	5

DATA RECONCILIATION

Uniformed Members

Valuation Year	Active Members Beginning of Year	Retired	Disabled	Died	Vested Terminated	Non-Vested Terminated	New	Active Members End of Year
2005	1,041	15	0	1	14	5	70	1,076
2006	1,076	17	0	2	11	28	42	1,060
2007	1,060	22	1	0	8	15	40	1,054
2008	1,054	17	0	0	4	12	49	1,070
2009	1,070	26	0	1	9	5	54	1,083
2010	1,083							
5-year	1,041	97	1	4	46	65	255	1,083
Expected		127	4	4	64	35		

Non-Uniformed Members

Valuation Year	Active Members Beginning of Year	Retired	Disabled	Died	Vested Terminated	Non-Vested Terminated	New	Active Members End of Year
2005	7,961	141	13	12	99	308	729	8,117
2006	8,117	194	21	10	169	470	720	7,973
2007	7,973	229	30	5	161	497	535	7,586
2008	7,586	229	19	3	149	302	645	7,529
2009	7,529	225	14	2	103	205	721	7,701
2010	7,701							
5-year	7,961	1,018	97	32	681	1,782	3,350	7,701
Expected		860	96	40	571	1,145		

ECONOMIC ASSUMPTIONS

Economic assumptions include **long-term rates of investment return** (net after expenses) and **wage inflation** (the across-the-board portion of salary increases). Unlike demographic activities, economic activities do not lend themselves to analysis solely on the basis of internal historical patterns because returns are more affected by external forces; namely inflation and general productivity changes 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 are increased by some provision for long-term inflation.

If inflation and/or productivity increases are higher than expected, it will probably result in both actual rates of salary increases and investment return which exceed the assumed rates. Salaries increasing faster than expected produce unexpected liabilities. Investment return exceeding the assumed rates (whether due to manager performance, change in the mix of assets, or general market conditions) results in unanticipated assets. To the extent that inflation, productivity, and other factors have about the same effect on both sides of the balance sheet, these additional assets and liabilities can offset one another over the long-term.

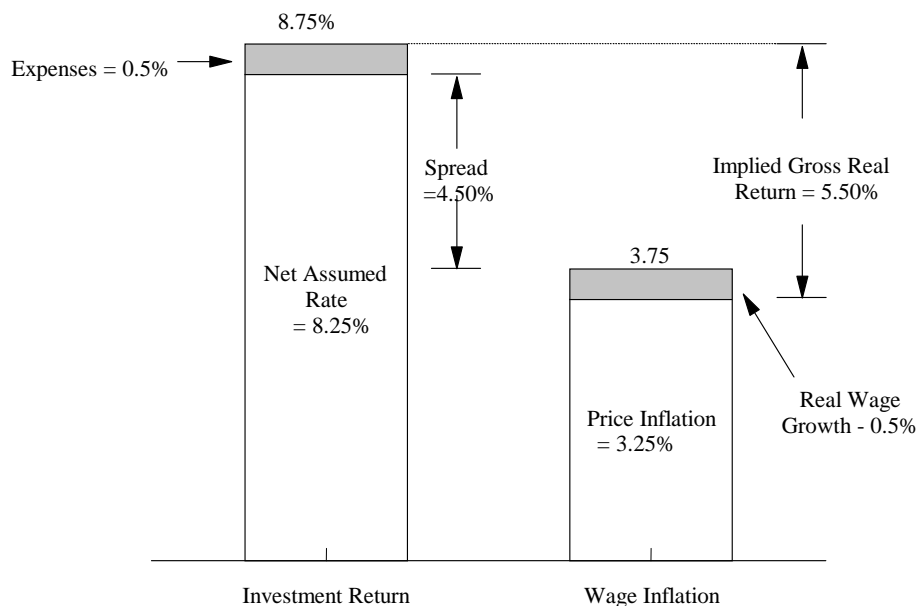
The present experience period includes investment results that are most unusual by long-term standards. While information from the present experience period may be considered in developing new assumptions, long-term historical patterns must necessarily play a much larger role.

Wage inflation. The average rate of increase in National Average Earnings over the last 60 years is higher than the current MPERS 4.0% assumption (see schedule on page 10). However, both regional and national average salaries have risen at a slower pace than 4.0% per year since 1999 (the MPERS average has been 2.7% annually and the national average has been 3.3%). Based on this information, we believe it is reasonable to use a wage inflation assumption at or below the current 3.75% assumption. We have shown cost estimates based on 3.50% and 3.75%.

Investment Return. We believe that 8.25% continues to be within the range assumed by other systems, although it is above average. In reviewing historical rates of return, based on a sample portfolio with a similar asset allocation to MPERS, we see the 5, 10 and 60 year returns to be 2.9%, 2.6% and 9.3%, respectively. However, if the extreme downturn of 2008 is removed the historical rates are much higher. For example the 5 year, 10 year and 58 year returns are 9.6%, 6.3% and 9.8%, respectively for periods ending December 31, 2007. Whether the future will be more like the more distant past than the recent past cannot be known now. However, even prior to the 2008 investment market disappointments, 8% was the most common interest rate assumption for governmental plans similar to MPERS. Therefore we are showing results based on an 8.25% rate of return assumption, an 8.00% rate of return assumption and a 7.75% rate of return assumption.

Resulting Spread. The combination of 8.25% assumed return and 3.75% assumed rate of payroll growth results in an assumed “spread” of 4.50% ($8.25\% - 3.75\% = 4.50\%$). Spreads for balanced portfolios have actually averaged 4.0% over the last 60 years (please see page 10), even including the poor investment experience in the early 2000s, periods of very high price and wage inflation in the late 1970s and the 2008 market downturn. We believe that an assumed spread of 4.0% to 4.5% is reasonable for MPERS.

The relationship between economic assumptions based on a 4.25% spread is illustrated below. We suggest that the investment consultant be asked for advice before the Board makes its final decision on economic assumptions.



HISTORICAL PATTERNS OF INVESTMENT RETURN, PAY INCREASES & INFLATION

Calendar Year Period	Gross Market Returns			Stocks (S&P 500)	Price Inflation (CPI)	National Average Earnings	Sample Balanced Fund*	
	Bonds (Long)		Cash Equiv. (T Bills)				Total Return (I)	Spread: I - NAE - e
	U.S. Treasury	Corp. (S&P AA)						
1950-59	(0.1)%	1.0 %	1.9 %	19.4 %	2.2 %	4.5 %	12.4 %	7.4 %
1960-69	1.4 %	1.7 %	3.9 %	7.8 %	2.5 %	4.3 %	5.9 %	1.1 %
1970-79	5.5 %	6.2 %	6.3 %	5.9 %	7.4 %	6.9 %	6.3 %	(1.1)%
1980-89	12.6 %	13.0 %	8.9 %	17.5 %	5.1 %	5.8 %	15.3 %	9.0 %
1990-99	8.8 %	8.4 %	4.9 %	18.2 %	2.9 %	4.2 %	14.0 %	9.3 %
2000-04	10.3 %	10.7 %	2.7 %	(2.3)%	2.5 %	3.2 %	2.2 %	(1.5)%
2005	7.8 %	5.9 %	3.0 %	4.9 %	3.4 %	3.7 %	5.1 %	0.9 %
2006	1.2 %	3.2 %	4.8 %	15.8 %	2.5 %	4.6 %	10.8 %	5.7 %
2007	9.9 %	2.6 %	4.7 %	5.5 %	4.1 %	4.5 %	5.4 %	0.4 %
2008	25.9 %	8.8 %	1.6 %	(37.0)%	0.1 %	2.3 %	(18.1)%	(20.9)%
2009	(14.9)%	3.0 %	0.1 %	26.5 %	2.7 %	1.7 %	14.9 %	12.7 %
Last 5 Years	5.1 %	4.7 %	2.8 %	0.4 %	2.6 %	3.4 %	2.9 %	(1.0)%
Last 10 Years	7.7 %	7.6 %	2.8 %	(0.9)%	2.5 %	3.3 %	2.6 %	(1.2)%
Last 60 Years	5.9 %	6.2 %	4.7 %	11.0 %	3.8 %	4.8 %	9.3 %	4.0 %

Historical Patterns as of December 31, 2007

Last 5 Years	5.7 %	5.1 %	2.9 %	12.8 %	3.0 %	4.0 %	9.6 %	5.1 %
Last 10 Years	7.3 %	6.7 %	3.5 %	5.9 %	2.7 %	4.0 %	6.3 %	1.8 %
Last 58 Years	6.0 %	6.2 %	4.9 %	11.9 %	3.8 %	4.9 %	9.8 %	4.4 %

* Sample Balanced Fund	
Equities	60%
Bonds - Government	10%
- Corporate	15%
Cash Equivalents	15%
Fund expenses(e)	100%
	0.50%

# Historical Spread	
# Observed spread is very sensitive to the observation period, even over long periods, as illustrated below:	
Observation Period	Spread
60 years	
50 years	
40 years	
30 years	

OTHER RECOMMENDATIONS

Load for unused sick leave: Currently Normal and Early retirement benefits are increased by 4.3% for Uniformed members and 2.6% for Non-Uniformed members to account for the inclusion of unused sick leave in the calculation of Average Pay. Based on the members who have retired over the last 5 years:

Member Group	Number	Average Service	Average Unused Sick Leave*	Ratio
Uniformed	97	31.1 yrs	0.64 yrs	2.05%
MoDOT	864	25.7 yrs	0.65 yrs	2.54%
Civilian Patrol	154	26.1 yrs	0.63 yrs	2.40%

* Based on crediting 1 month of service for every 168 hours of unused sick leave.

This review supports continued use of the current load for Non-Uniformed and a reduction in the load for Uniformed. We recommend that the load be continued at 2.6% for Non-Uniformed members and decreased to 3% for Uniformed members.

Optional forms of payment: Reduction factors for MSEP 2000 are codified in the statute and are probably slightly subsidized (compared to factors based on the recommended valuation interest and mortality assumptions). Factors for MSEP are adopted by the Board. We reviewed these factors and find them to be actuarially equivalent within reasonable tolerances. The load for MSEP 2000 was determined by looking at the members who retired during the last five years and determining the following information:

- Average age at retirement and option elected;
- Average beneficiary age at retirement;
- Percent of members electing each type of option;
- Percent of males electing each type of option.

Based on this information, the actuarial equivalent option factor was developed for each Joint & Survivor option and compared with the statutory factor. Based on the recommended mortality table, these factors also appear to be actuarially equivalent within reasonable tolerances. We therefore, recommend removing this load.

Load for end of career increases in compensation: There is currently no load for this activity. We reviewed pays for members who retired in the last 5 years and found that their actual final average salaries (FAS) at retirement were close to the FAS projected from the reported active member data in the 3-year and 6-year periods prior to their retirement. We therefore recommend a continuation of not loading for end of career increases in compensation.

**SUMMARY OF LIABILITY GAINS AND LOSSES
DURING 5-YEAR PERIOD**

Liability Gain/(Loss) for Year	Non-Uniform	Uniform	Total
2008/2009	\$ (3,694,456)	\$ 7,930,782	\$ 4,236,326
2007/2008	(11,130,449)	(19,840,263)	(30,970,712)
2006/2007	(39,253,871)	(28,770,618)	(68,024,489)
2005/2006	(6,596,319)	(1,558,598)	(8,154,917)
2004/2005	(29,141,047)	(20,286,410)	(49,427,457)
Total	\$ (89,816,142)	\$ (62,525,107)	\$ (152,341,249)

SECTION B

SUMMARY OF THE VALUATION RESULTS

SUMMARY OF VALUATION RESULTS

The table below describes hypothetical valuation results at June 30, 2009 with new and old decrement assumptions with indicated spreads. The rate changes are illustrative only since contribution rates have already been set based upon the actual June 30, 2009 valuation results.

	Present Decrement and Present Economic Assumptions	Proposed Decrement Assumptions and			
		Present Economic	Economic Alt. 1	Economic Alt. 2	Economic Alt. 3
Economic Assumptions					
Investment Return	8.25 %	8.25 %	8.00 %	8.00 %	7.75 %
Wage Inflation	3.75 %	3.75 %	3.50 %	3.75 %	3.50 %
Spread on Wages	4.50 %	4.50 %	4.50 %	4.25 %	4.25 %
Price Inflation	3.25 %	3.25 %	3.00 %	3.25 %	3.00 %
Non-Uniformed Group					
Contributions for					
Normal Cost	11.29 %	11.43 %	11.55 %	12.12 %	12.26 %
Unfunded Actuarial Accrued Liability	26.95 %	28.28 %	29.03 %	29.19 %	29.97 %
Disability Insurance	0.53 %	0.53 %	0.53 %	0.53 %	0.53 %
Administrative Expenses	0.69 %	0.69 %	0.69 %	0.69 %	0.69 %
Total Computed Employer Contribution	39.46 %	40.93 %	41.80 %	42.53 %	43.45 %
Uniformed Group					
Contributions for					
Normal Cost	13.08 %	14.52 %	14.65 %	15.42 %	15.57 %
Unfunded Actuarial Accrued Liability	35.23 %	37.22 %	38.62 %	38.86 %	40.31 %
Disability Insurance	0.53 %	0.53 %	0.53 %	0.53 %	0.53 %
Administrative Expenses	0.69 %	0.69 %	0.69 %	0.69 %	0.69 %
Total Computed Employer Contribution	49.53 %	52.96 %	54.49 %	55.50 %	57.10 %
MPERS Funded Status	47.3 %	46.2 %	45.6 %	44.9 %	44.2 %
MPERS Combined Employer Contribution Rate	41.27 %	43.09 %	44.09 %	44.86 %	45.91 %

New assumptions will be first used in the June 30, 2010 actuarial valuations, at which time experience gains or losses incurred during 2009/2010 will also be recognized. Consequently, no rate changes are recommended at this time.

SECTION C

WITHDRAWAL EXPERIENCE

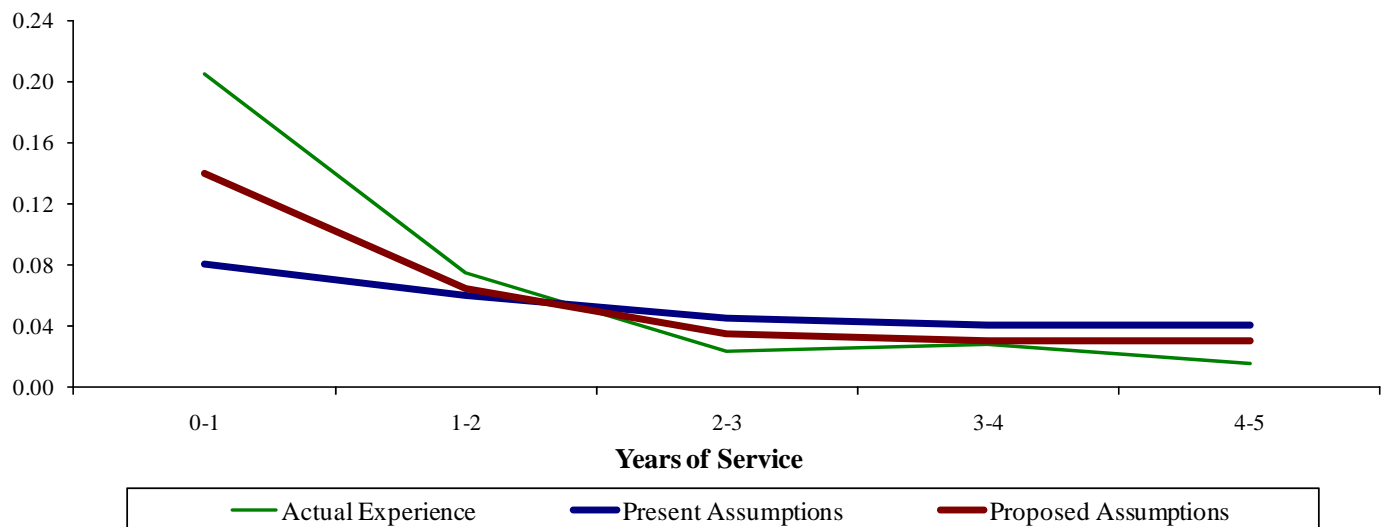
UNIFORMED MEMBERS SERVICE-BASED WITHDRAWAL EXPERIENCE

There were 49 withdrawals and 835 years of exposure included in the service-based withdrawal investigation. Withdrawals are separations from active member status for a reason other than disability, death, or retirement.

WITHDRAWALS WITH LESS THAN 5 YEARS OF SERVICE

Years of Service	Life Years Exposure	Number of Withdrawals			Withdrawal Rates		
		Actual Experience	Expected		Actual	Expected	
			Present	Proposed		Present	Proposed
0-1	117	24	9	16	0.2051	0.0800	0.1400
1-2	173	13	10	11	0.0751	0.0600	0.0650
2-3	173	4	7	6	0.0231	0.0450	0.0350
3-4	178	5	6	5	0.0281	0.0400	0.0300
4-5	194	3	5	6	0.0155	0.0400	0.0300
Totals	835	49	37	44	0.0587	0.0443	0.0527

RATES OF WITHDRAWALS WITH LESS THAN 5 YEARS OF SERVICE



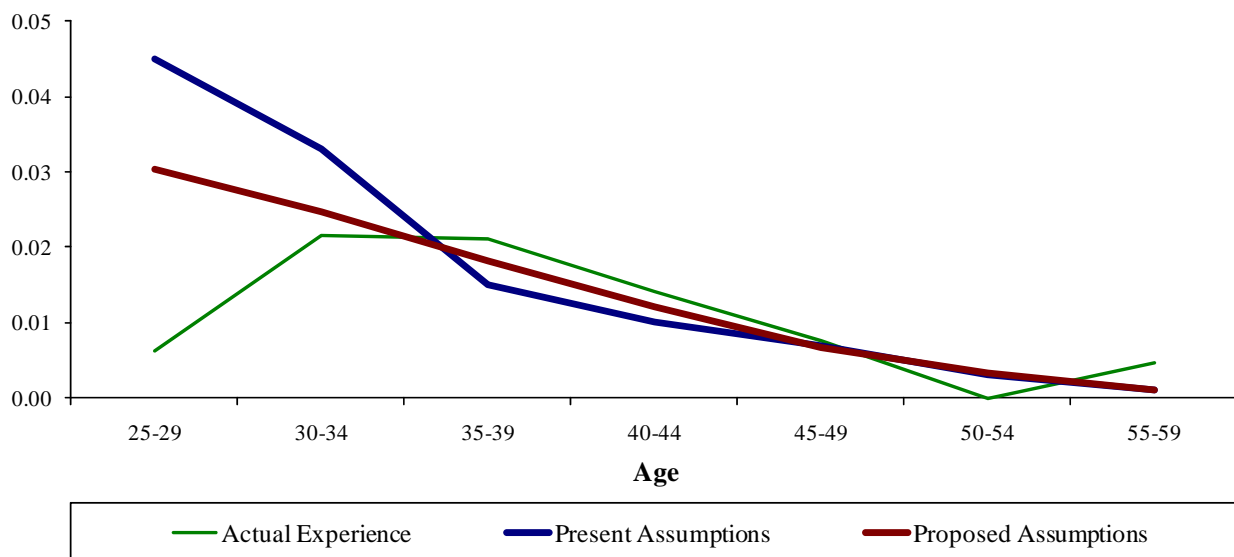
UNIFORMED MEMBERS AGE-BASED WITHDRAWAL EXPERIENCE

There were 62 withdrawals and 4,461 years of exposure included in the age-based withdrawal investigation. Withdrawals are separations from active member status for a reason other than disability, death, or retirement. We also looked at the ages from 30-59 separately since the majority of the exposure is at these ages. On this basis, the analysis warranted an increase in rates over the current table.

WITHDRAWALS WITH 5 OR MORE YEARS OF SERVICE

Age	Life Years Exposure	Number of Withdrawals			Withdrawal Rates		
		Actual Experience	Expected		Actual	Expected	
			Present	Proposed		Present	Proposed
25-29	157	1	6	5	0.0064	0.0450	0.0302
30-34	741	16	20	18	0.0216	0.0330	0.0248
35-39	1,231	26	20	22	0.0211	0.0150	0.0181
40-44	923	13	10	11	0.0141	0.0100	0.0121
45-49	666	5	5	5	0.0075	0.0070	0.0066
50-54	531	-	1	2	0.0000	0.0030	0.0033
55-59	212	1	-	-	0.0047	0.0010	0.0011
Totals	4,461	62	62	63	0.0139	0.0139	0.0141
Total from 30-59	4,304	61	56	58	0.0142	0.0130	0.0135

RATES OF WITHDRAWALS WITH 5 OR MORE YEARS OF SERVICE



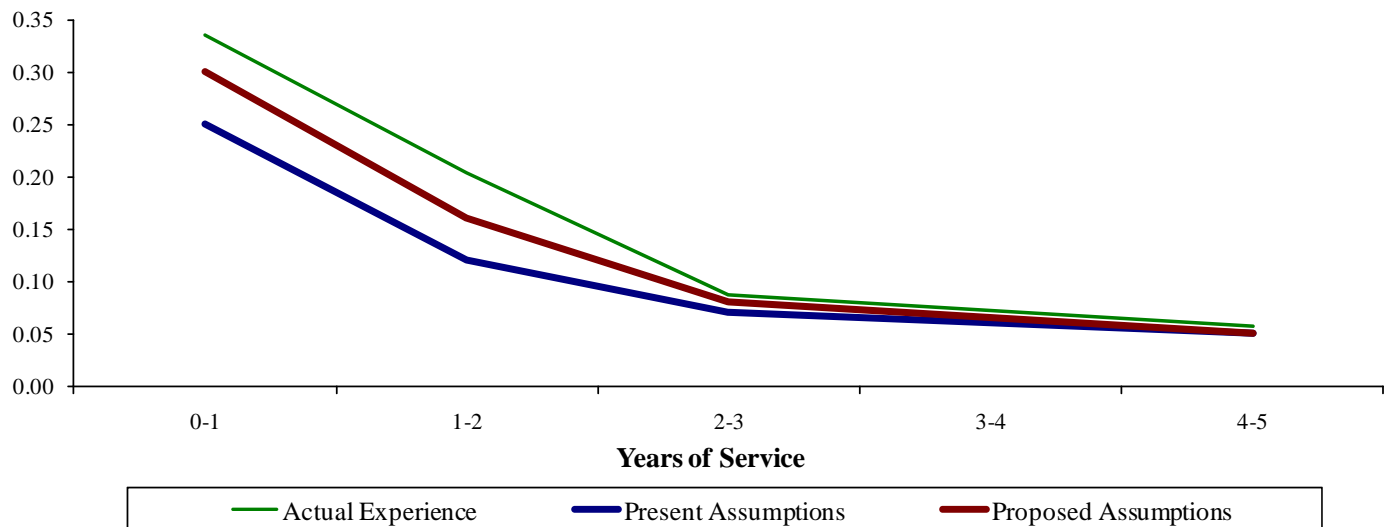
NON-UNIFORMED MALES SERVICE-BASED WITHDRAWAL EXPERIENCE

There were 1,373 withdrawals and 8,128 years of exposure included in the male service-based withdrawal investigation. Withdrawals are separations from active member status for a reason other than disability, death, or retirement.

WITHDRAWALS WITH LESS THAN 5 YEARS OF SERVICE

Years of Service	Life Years Exposure	Number of Withdrawals			Withdrawal Rates		
		Actual Experience	Expected		Actual	Expected	
			Present	Proposed		Present	Proposed
0-1	2,034	683	483	610	0.3358	0.2500	0.3000
1-2	1,916	390	224	307	0.2035	0.1200	0.1600
2-3	1,336	117	95	107	0.0876	0.0700	0.0800
3-4	1,383	100	84	90	0.0723	0.0600	0.0650
4-5	1,459	83	71	73	0.0569	0.0500	0.0500
Totals	8,128	1,373	957	1,187	0.1689	0.1177	0.1460

RATES OF WITHDRAWALS WITH LESS THAN 5 YEARS OF SERVICE



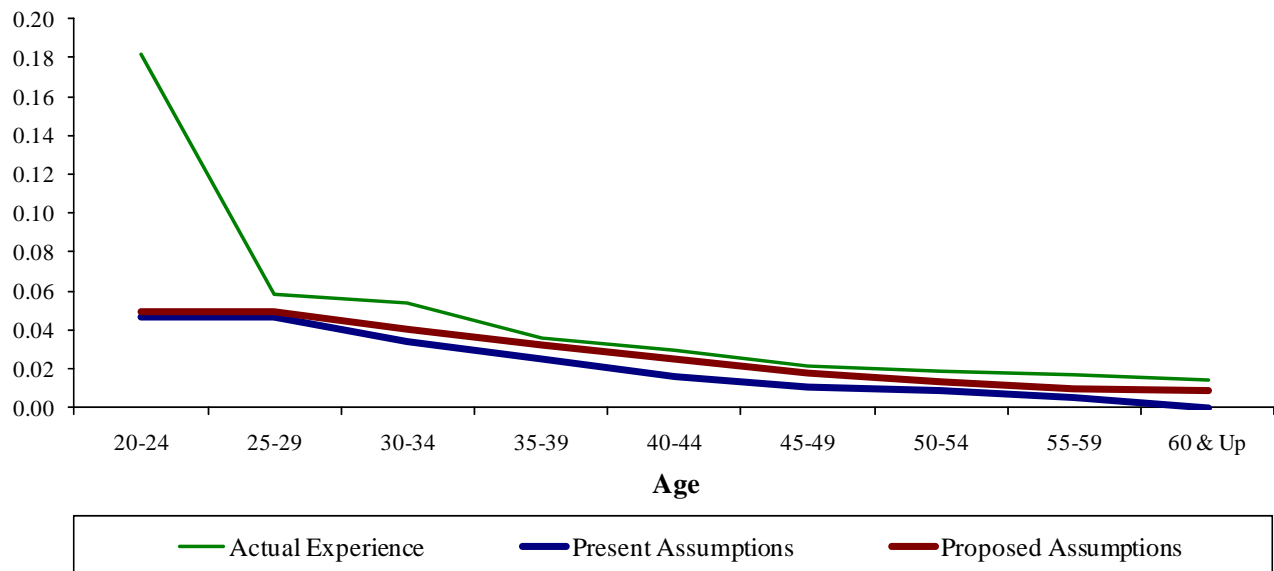
NON-UNIFORMED MALES AGE-BASED WITHDRAWAL EXPERIENCE

There were 581 withdrawals and 21,023 years of exposure included in the male age-based withdrawal investigation. Withdrawals are separations from active member status for a reason other than disability, death, or retirement.

WITHDRAWALS WITH 5 OR MORE YEARS OF SERVICE

Age	Life Years Exposure	Number of Withdrawals			Withdrawal Rates		
		Actual Experience	Expected		Actual	Expected	
			Present	Proposed		Present	Proposed
20-24	11	2	-	1	0.1818	0.0470	0.0493
25-29	703	41	30	33	0.0583	0.0470	0.0493
30-34	1,908	103	63	77	0.0540	0.0340	0.0404
35-39	2,730	97	66	87	0.0355	0.0250	0.0321
40-44	3,651	109	59	89	0.0299	0.0160	0.0246
45-49	4,713	100	54	86	0.0212	0.0110	0.0182
50-54	3,997	76	26	54	0.0190	0.0090	0.0133
55-59	2,399	40	2	24	0.0167	0.0050	0.0100
60 & Up	911	13	1	8	0.0143	0.0001	0.0086
Totals	21,023	581	301	459	0.0276	0.0143	0.0218

RATES OF WITHDRAWALS WITH 5 OR MORE YEARS OF SERVICE



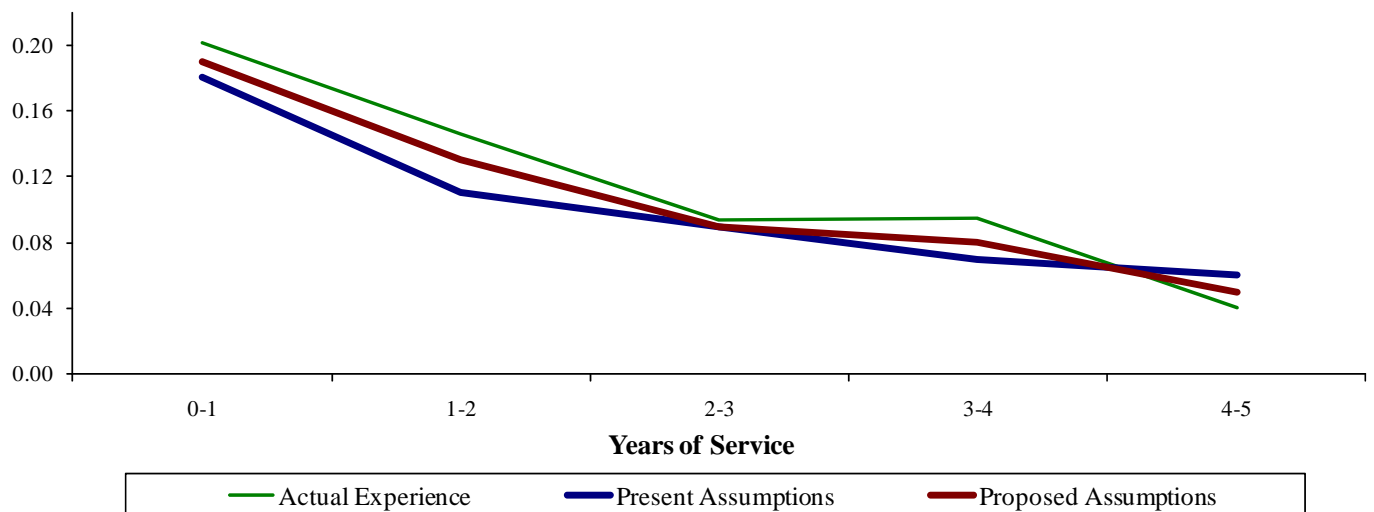
NON-UNIFORMED FEMALES SERVICE-BASED WITHDRAWAL EXPERIENCE

There were 275 withdrawals and 2,391 years of exposure included in the female service-based withdrawal investigation. Withdrawals are separations from active member status for a reason other than disability, death, or retirement.

WITHDRAWALS WITH LESS THAN 5 YEARS OF SERVICE

Years of Service	Life Years Exposure	Number of Withdrawals			Withdrawal Rates		
		Actual Experience	Expected		Actual	Expected	
			Present	Proposed		Present	Proposed
0-1	407	82	71	77	0.2015	0.1800	0.1900
1-2	618	90	66	80	0.1456	0.1100	0.1300
2-3	458	43	41	41	0.0939	0.0900	0.0900
3-4	433	41	31	35	0.0947	0.0700	0.0800
4-5	475	19	28	24	0.0400	0.0600	0.0500
Totals	2,391	275	237	257	0.1150	0.0991	0.1075

RATES OF WITHDRAWALS WITH LESS THAN 5 YEARS OF SERVICE



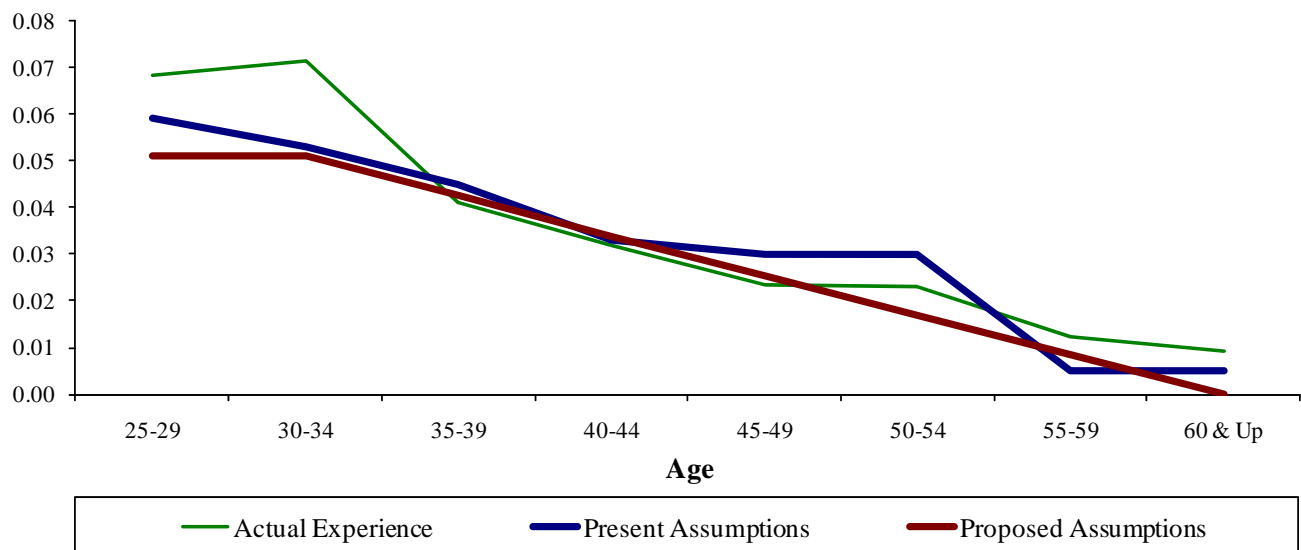
NON-UNIFORMED FEMALES AGE-BASED WITHDRAWAL EXPERIENCE

There were 234 withdrawals and 7,384 years of exposure included in the female age-based withdrawal investigation. Withdrawals are separations from active member status for a reason other than disability, death, or retirement.

WITHDRAWALS WITH 5 OR MORE YEARS OF SERVICE

Age	Life Years Exposure	Number of Withdrawals			Withdrawal Rates		
		Actual Experience	Expected		Actual	Expected	
			Present	Proposed		Present	Proposed
25-29	277	19	16	14	0.0686	0.0593	0.0510
30-34	659	47	34	33	0.0713	0.0530	0.0510
35-39	1,073	44	47	45	0.0410	0.0450	0.0425
40-44	1,383	44	46	47	0.0318	0.0330	0.0340
45-49	1,609	38	49	41	0.0236	0.0300	0.0255
50-54	1,249	29	28	22	0.0232	0.0300	0.0170
55-59	811	10	1	7	0.0123	0.0050	0.0085
60 & Up	323	3	-	1	0.0093	0.0050	0.0000
Totals	7,384	234	221	210	0.0317	0.0299	0.0284

RATES OF WITHDRAWALS WITH 5 OR MORE YEARS OF SERVICE



SECTION D

DISABILITY EXPERIENCE

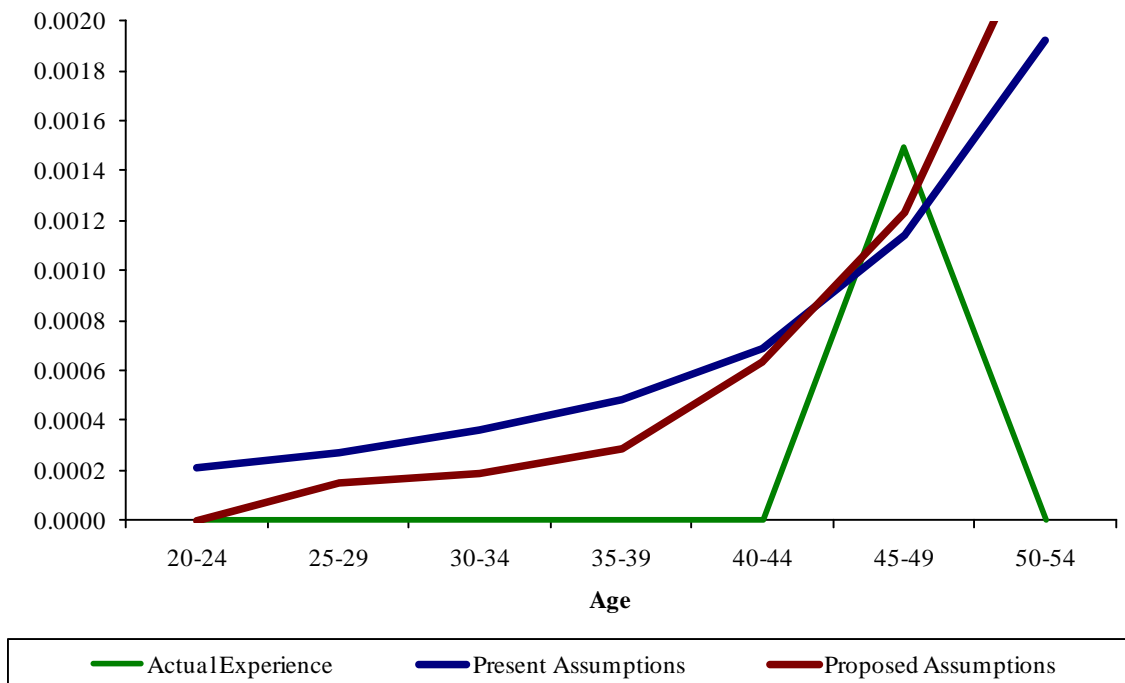
UNIFORMED MEMBERS DISABILITY EXPERIENCE

There was 1 disability benefit claim reported for the 5-year period and years of exposure.

DISABLED UNIFORMED MEMBERS

Age	Life Years Exposure	Number of Disabilities			Disability Rates		
		Actual Experience	Expected		Actual	Expected	
			Present	Proposed		Present	Proposed
20-24	129	-	-	-	0.0000	0.0002	0.0000
25-29	574	-	-	-	0.0000	0.0003	0.0001
30-34	955	-	-	-	0.0000	0.0004	0.0002
35-39	1,280	-	1	-	0.0000	0.0005	0.0003
40-44	941	-	1	1	0.0000	0.0007	0.0006
45-49	670	1	1	1	0.0015	0.0011	0.0012
50-54	535	-	1	1	0.0000	0.0019	0.0024
Totals	5,084	1	4	3	0.0002	0.0008	0.0006

RATES OF DISABLED UNIFORMED MEMBERS



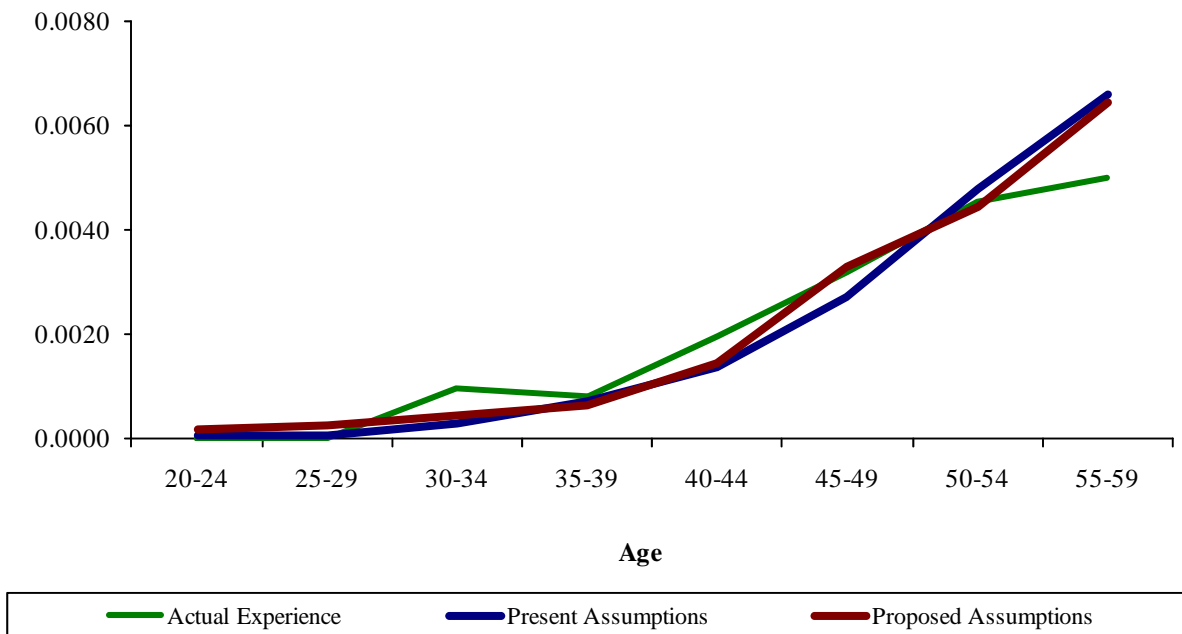
NON-UNIFORMED MALES DISABILITY EXPERIENCE

There were 68 disability benefit claims reported for the 5-year period and years of exposure.

DISABLED NON-UNIFORMED MALES

Age	Life Years Exposure	Number of Disabilities			Disability Rates		
		Actual Experience	Expected		Actual	Expected	
			Present	Proposed		Present	Proposed
20-24	973	-	-	-	0.0000	0.0001	0.0002
25-29	2,482	-	-	1	0.0000	0.0001	0.0003
30-34	3,140	3	1	1	0.0010	0.0003	0.0004
35-39	3,755	3	3	2	0.0008	0.0007	0.0006
40-44	4,612	9	6	7	0.0020	0.0014	0.0015
45-49	5,616	18	15	18	0.0032	0.0027	0.0033
50-54	4,614	21	22	21	0.0046	0.0048	0.0044
55-59	2,805	14	19	18	0.0050	0.0066	0.0064
Totals	27,997	68	66	68	0.0024	0.0024	0.0024

RATES OF DISABLED NON-UNIFORMED MALES



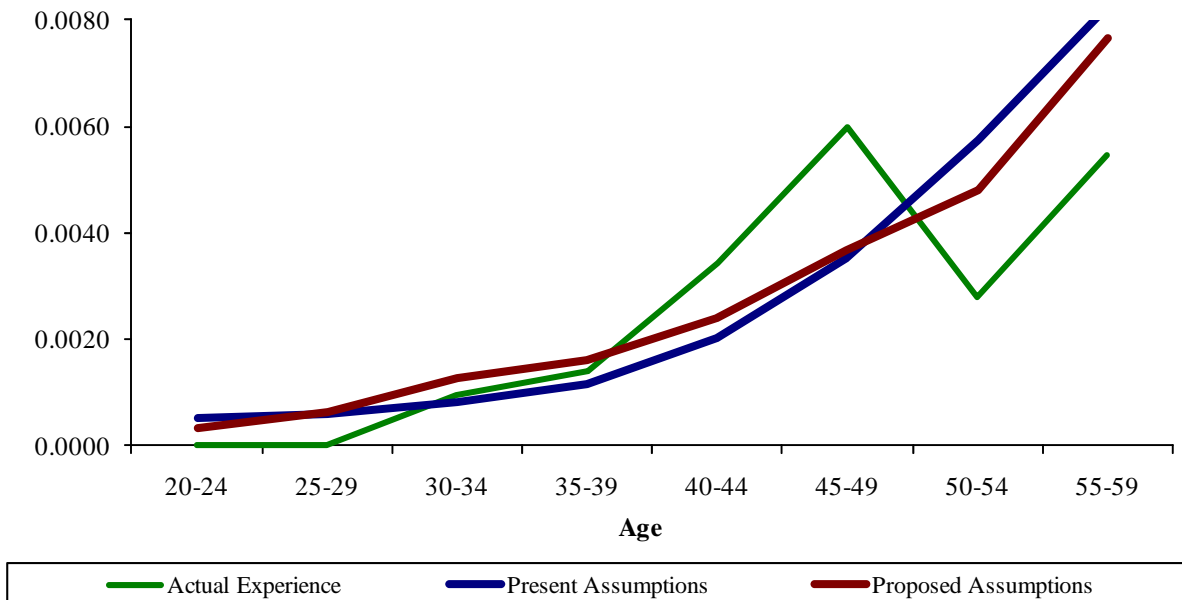
NON-UNIFORMED FEMALES DISABILITY EXPERIENCE

There were 29 disability benefit claims reported for the 5-year period and years of exposure.

DISABLED NON-UNIFORMED FEMALES

Age	Life Years Exposure	Number of Disabilities			Disability Rates		
		Actual Experience	Expected		Actual	Expected	
			Present	Proposed		Present	Proposed
20-24	199	-	-	-	0.0000	0.0005	0.0003
25-29	804	-	1	1	0.0000	0.0006	0.0006
30-34	1,053	1	1	1	0.0009	0.0008	0.0013
35-39	1,428	2	2	2	0.0014	0.0012	0.0016
40-44	1,755	6	4	4	0.0034	0.0020	0.0024
45-49	1,834	11	7	7	0.0060	0.0035	0.0037
50-54	1,427	4	9	7	0.0028	0.0058	0.0048
55-59	914	5	8	7	0.0055	0.0083	0.0077
Totals	9,414	29	32	29	0.0031	0.0034	0.0031

RATES OF DISABLED NON-UNIFORMED FEMALES



SECTION E

RETIREMENT EXPERIENCE

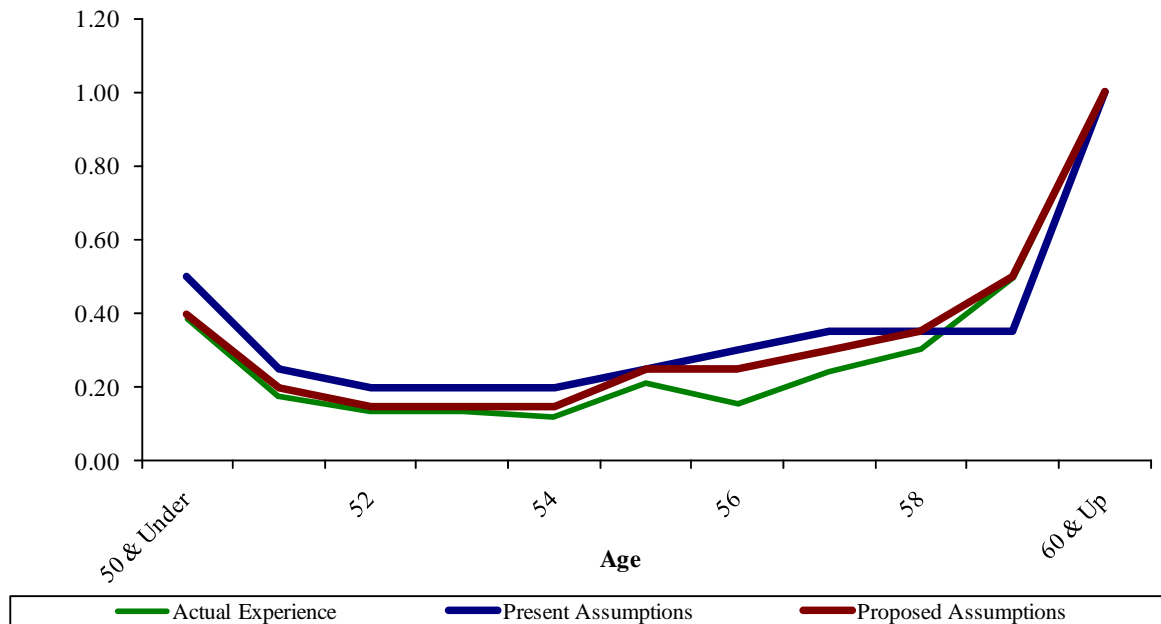
UNIFORMED MEMBERS NORMAL RETIREMENT EXPERIENCE

There were 97 age and service unreduced retirements and 505 life years of exposure (exposure includes active members eligible for unreduced retirement) in the retirement investigation.

SUMMARY OF UNIFORMED AGE & SERVICE UNREDUCED RETIREMENT EXPERIENCE

Age	Life Years Exposure	Number of Retirements			Retirement Rates		
		Actual Experience	Expected		Actual	Expected	
			Present	Proposed		Present	Proposed
50 & Under	13	5	6	5	0.3846	0.5000	0.4000
51	45	8	10	9	0.1778	0.2500	0.2000
52	80	11	15	12	0.1375	0.2000	0.1500
53	82	11	15	12	0.1341	0.2000	0.1500
54	68	8	13	10	0.1176	0.2000	0.1500
55	76	16	19	19	0.2105	0.2500	0.2500
56	58	9	17	15	0.1552	0.3000	0.2500
57	41	10	14	12	0.2439	0.3500	0.3000
58	23	7	8	8	0.3043	0.3500	0.3500
59	14	7	5	7	0.5000	0.3500	0.5000
60 & Up	5	5	5	5	1.0000	1.0000	1.0000
Totals	505	97	127	114	0.1921	0.2515	0.2257

RATES OF UNREDUCED RETIREMENT EXPERIENCE FOR UNIFORMED MEMBERS



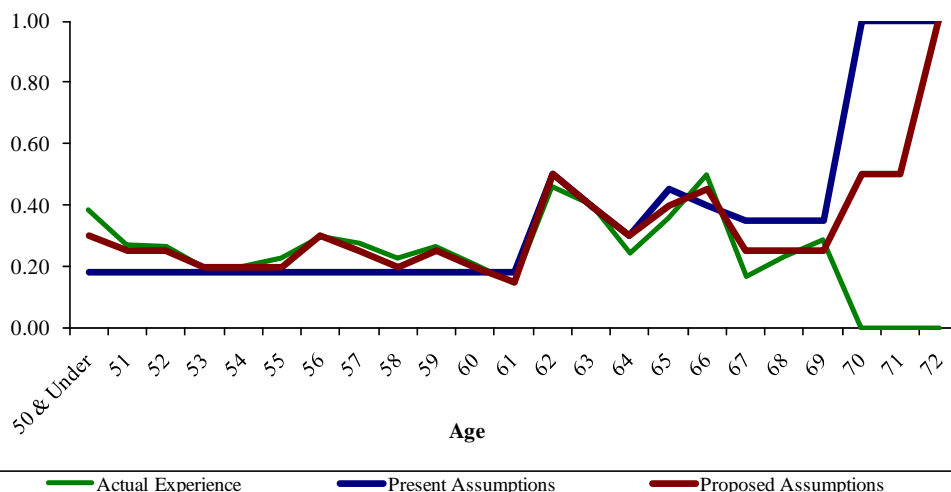
NON-UNIFORMED MALES NORMAL RETIREMENT EXPERIENCE

There were 757 age and service unreduced retirements and 2,868 life years of exposure (exposure includes active members eligible for unreduced retirement) in the male retirement investigation.

SUMMARY OF NON-UNIFORMED MALES AGE & SERVICE UNREDUCED RETIREMENT EXPERIENCE

Age	Life Years Exposure	Number of Retirements			Retirement Rates		
		Actual Experience	Expected		Actual	Expected	
			Present	Proposed		Present	Proposed
50 & Under	120	46	19	36	0.3833	0.1800	0.3000
51	200	54	31	50	0.2700	0.1800	0.2500
52	246	65	38	62	0.2642	0.1800	0.2500
53	233	46	36	47	0.1974	0.1800	0.2000
54	235	47	34	47	0.2000	0.1800	0.2000
55	243	55	38	49	0.2263	0.1800	0.2000
56	236	70	38	71	0.2966	0.1800	0.3000
57	204	56	32	51	0.2745	0.1800	0.2500
58	183	42	30	37	0.2295	0.1800	0.2000
59	161	43	26	40	0.2671	0.1800	0.2500
60	186	38	32	37	0.2043	0.1800	0.2000
61	162	24	26	24	0.1481	0.1800	0.1500
62	159	73	87	80	0.4591	0.5000	0.5000
63	87	35	37	35	0.4023	0.4000	0.4000
64	57	14	18	17	0.2456	0.3000	0.3000
65	59	21	27	24	0.3559	0.4500	0.4000
66	36	18	15	16	0.5000	0.4000	0.4500
67	18	3	7	5	0.1667	0.3500	0.2500
68	13	3	5	3	0.2308	0.3500	0.2500
69	7	2	2	2	0.2857	0.3500	0.2500
70	7	-	7	4	0.0000	1.0000	0.5000
71	6	-	6	3	0.0000	1.0000	0.5000
72	3	-	3	3	0.0000	1.0000	1.0000
Totals	2,861	755	594	743	0.2639	0.2076	0.2597
Other	7	2	7	7	0.2857	1.0000	1.0000

RATES OF UNREDUCED RETIREMENT EXPERIENCE FOR NON-UNIFORMED MALES



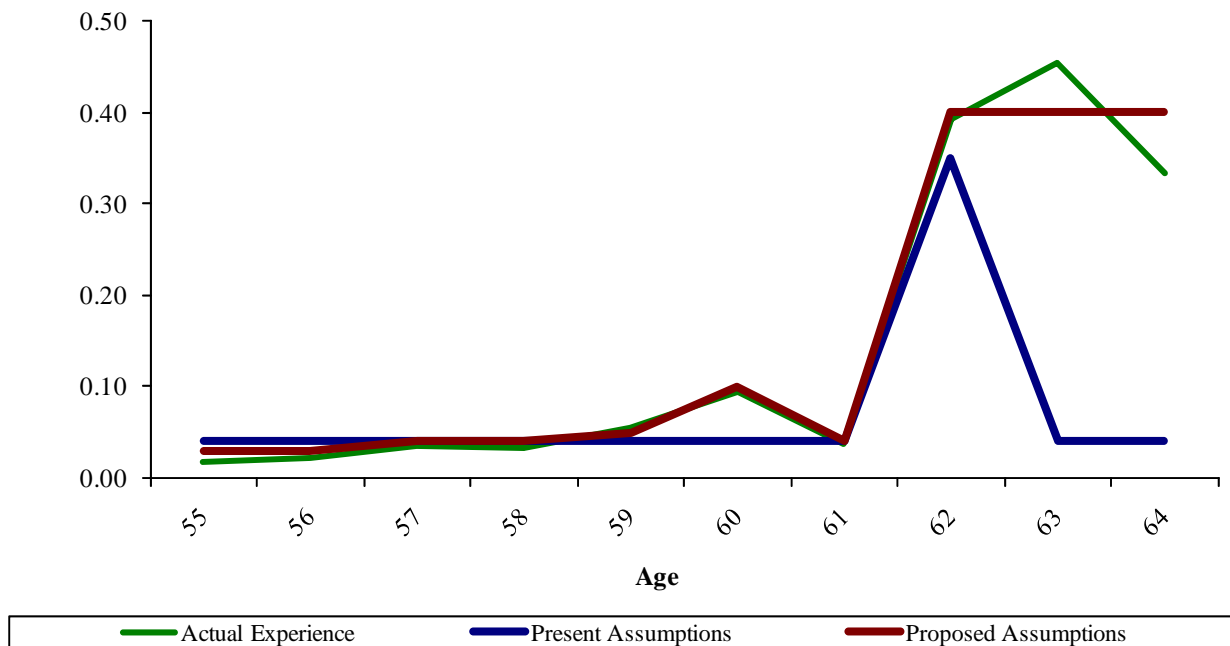
NON-UNIFORMED MALES EARLY RETIREMENT EXPERIENCE

There were 61 age and service reduced retirements and 1,284 life years of exposure (exposure includes active members eligible for reduced retirement) in the male retirement investigation.

SUMMARY OF NON-UNIFORMED MALES AGE & SERVICE REDUCED RETIREMENT EXPERIENCE

Age	Life Years Exposure	Number of Retirements			Retirement Rates		
		Actual Experience	Expected		Actual	Expected	
			Present	Proposed		Present	Proposed
55	283	5	13	8	0.0177	0.0400	0.0300
56	240	5	11	7	0.0208	0.0400	0.0300
57	227	8	11	9	0.0352	0.0400	0.0400
58	190	6	9	8	0.0316	0.0400	0.0400
59	166	9	7	8	0.0542	0.0400	0.0500
60	75	7	3	8	0.0933	0.0400	0.1000
61	55	2	2	2	0.0364	0.0400	0.0400
62	28	11	8	11	0.3929	0.3500	0.4000
63	11	5	1	4	0.4545	0.0400	0.4000
64	9	3	-	4	0.3333	0.0400	0.4000
Totals	1,284	61	65	69	0.0475	0.0506	0.0537

RATES OF REDUCED RETIREMENT EXPERIENCE FOR NON-UNIFORMED MALES



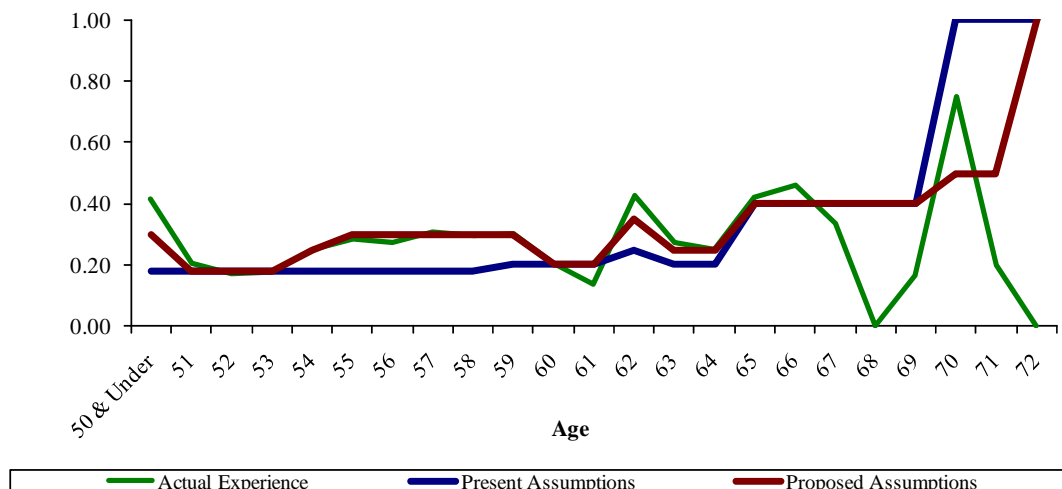
NON-UNIFORMED FEMALES NORMAL RETIREMENT EXPERIENCE

There were 176 age and service unreduced retirements and 660 life years of exposure (exposure includes active members eligible for unreduced retirement) in the female retirement investigation.

SUMMARY OF NON-UNIFORMED FEMALES AGE & SERVICE UNREDUCED RETIREMENT EXPERIENCE

Age	Life Years Exposure	Number of Retirements			Retirement Rates		
		Actual Experience	Expected		Actual	Expected	
			Present	Proposed		Present	Proposed
50 & Under	41	17	6	12	0.4146	0.1800	0.3000
51	44	9	7	8	0.2045	0.1800	0.1800
52	41	7	6	7	0.1707	0.1800	0.1800
53	39	7	6	7	0.1795	0.1800	0.1800
54	36	9	6	9	0.2500	0.1800	0.2500
55	35	10	6	11	0.2857	0.1800	0.3000
56	33	9	5	10	0.2727	0.1800	0.3000
57	36	11	5	11	0.3056	0.1800	0.3000
58	37	11	7	11	0.2973	0.1800	0.3000
59	43	13	8	13	0.3023	0.2000	0.3000
60	63	13	11	13	0.2063	0.2000	0.2000
61	51	7	9	10	0.1373	0.2000	0.2000
62	40	17	11	14	0.4250	0.2500	0.3500
63	22	6	4	6	0.2727	0.2000	0.2500
64	16	4	3	4	0.2500	0.2000	0.2500
65	19	8	8	8	0.4211	0.4000	0.4000
66	13	6	6	5	0.4615	0.4000	0.4000
67	9	3	4	4	0.3333	0.4000	0.4000
68	5	-	2	2	0.0000	0.4000	0.4000
69	6	1	3	2	0.1667	0.4000	0.4000
70	4	3	4	2	0.7500	1.0000	0.5000
71	5	1	5	3	0.2000	1.0000	0.5000
72	5	-	5	5	0.0000	1.0000	1.0000
Totals	643	172	137	177	0.2675	0.2131	0.2753
Other	17	4	17	17	0.2353	1.0000	1.0000

RATES OF UNREDUCED RETIREMENT EXPERIENCE FOR NON-UNIFORMED FEMALES



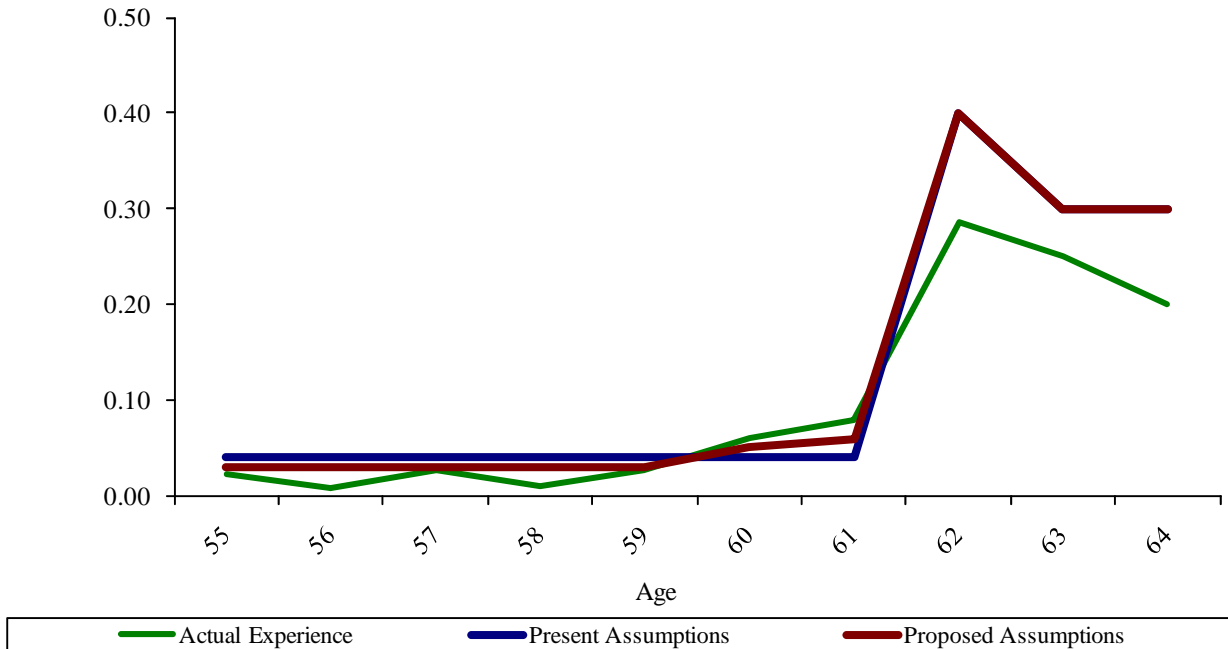
NON-UNIFORMED FEMALES EARLY RETIREMENT EXPERIENCE

There were 24 age and service reduced retirements and 636 life years of exposure (exposure includes active members eligible for reduced retirement) in the female retirement investigation.

SUMMARY OF NON-UNIFORMED FEMALES AGE & SERVICE REDUCED RETIREMENT EXPERIENCE

Age	Life Years Exposure	Number of Retirements			Retirement Rates		
		Actual Experience	Expected		Actual	Expected	
			Present	Proposed		Present	Proposed
55	130	3	6	4	0.0231	0.0400	0.0300
56	117	1	5	4	0.0085	0.0400	0.0300
57	116	3	5	3	0.0259	0.0400	0.0300
58	102	1	4	3	0.0098	0.0400	0.0300
59	75	2	3	2	0.0267	0.0400	0.0300
60	33	2	1	2	0.0606	0.0400	0.0500
61	25	2	1	2	0.0800	0.0400	0.0600
62	21	6	8	8	0.2857	0.4000	0.4000
63	12	3	3	4	0.2500	0.3000	0.3000
64	5	1	1	2	0.2000	0.3000	0.3000
Totals	636	24	37	34	0.0377	0.0582	0.0535

RATES OF REDUCED RETIREMENT EXPERIENCE FOR NON-UNIFORMED FEMALES

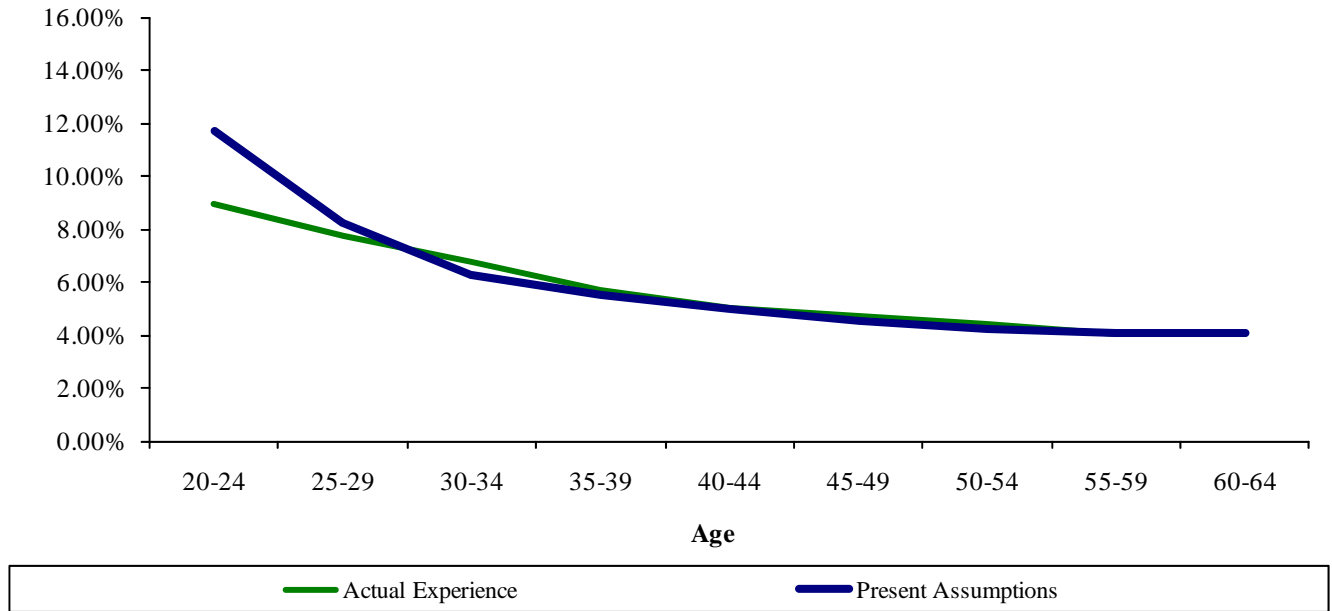


SECTION F
SALARY INCREASES

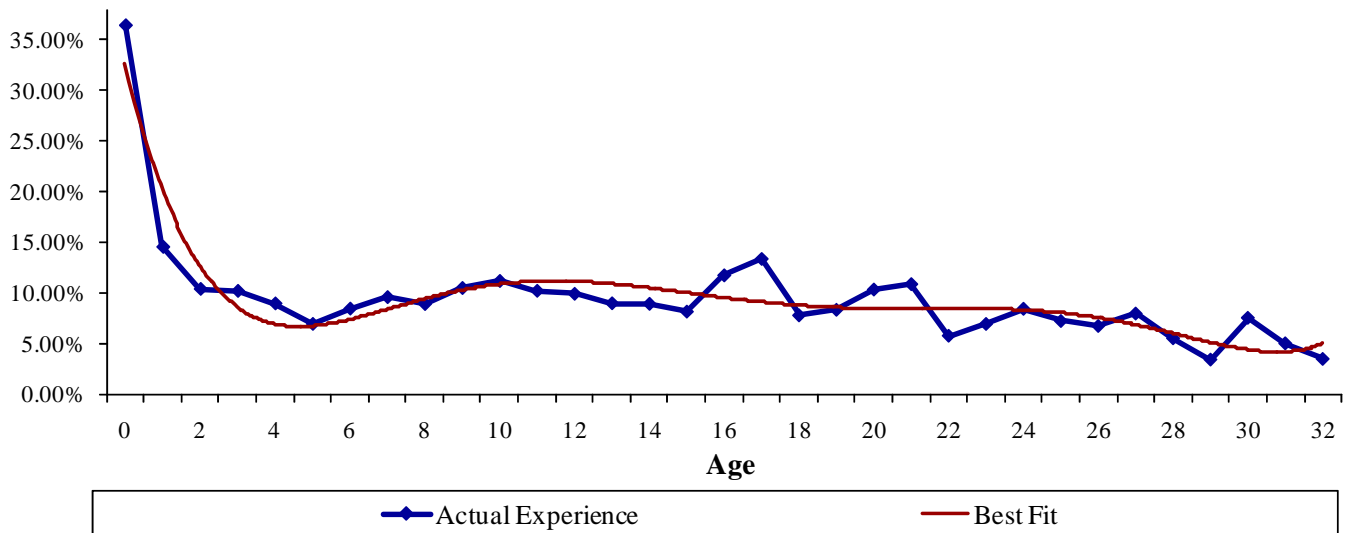
UNIFORMED MEMBERS GROSS PAY INCREASE ASSUMPTIONS

The graphs shown below illustrate gross rates of salary increases for Uniformed Members, according to age and service respectively. They demonstrate that rates of salary increases are highly correlated with age. New rates (merit and longevity portion only) are shown on the following page.

GROSS SALARY INCREASES – CORRELATION BY AGE



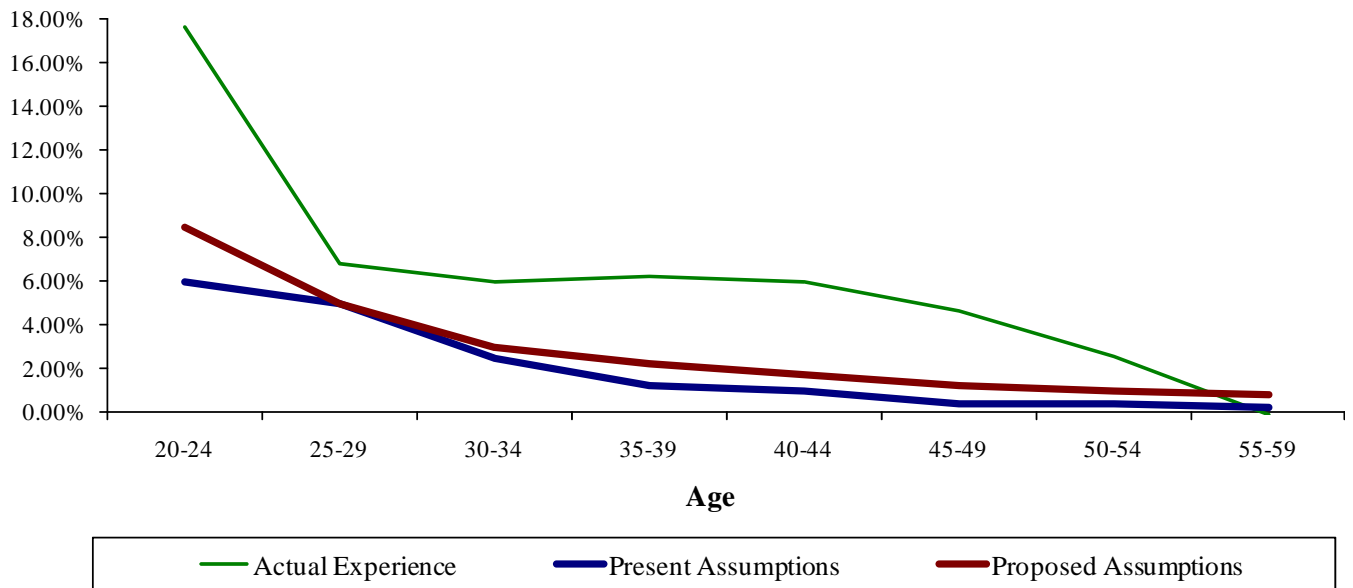
GROSS SALARY INCREASES – CORRELATION BY SERVICE



UNIFORMED MEMBERS MERIT & LONGEVITY PAY INCREASE ASSUMPTIONS

Age Group Beginning of Year	Number	Actual	Expected	Proposed
20-24	146	17.62 %	6.00 %	8.50 %
25-29	597	6.79 %	5.00 %	5.00 %
30-34	972	5.95 %	2.50 %	3.00 %
35-39	1,240	6.23 %	1.25 %	2.25 %
40-44	882	6.01 %	1.00 %	1.75 %
45-49	645	4.61 %	0.40 %	1.25 %
50-54	485	2.53 %	0.35 %	1.00 %
55-59	121	(0.10)%	0.25 %	0.80 %
Total	5,088			

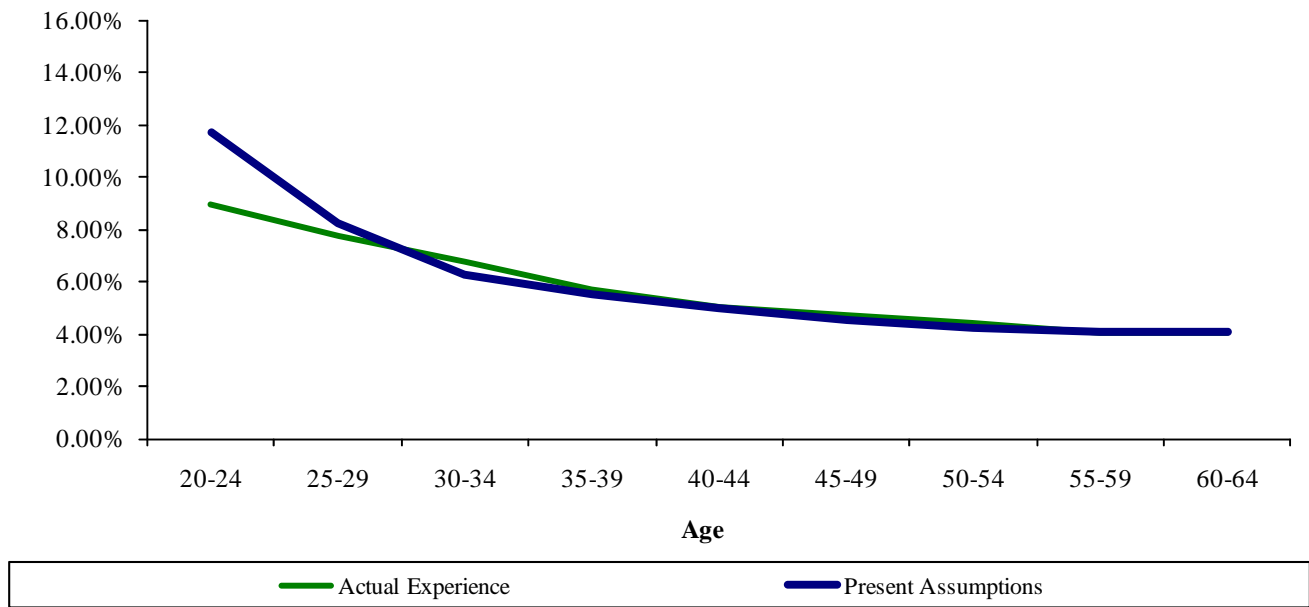
RATES OF SALARY INCREASES



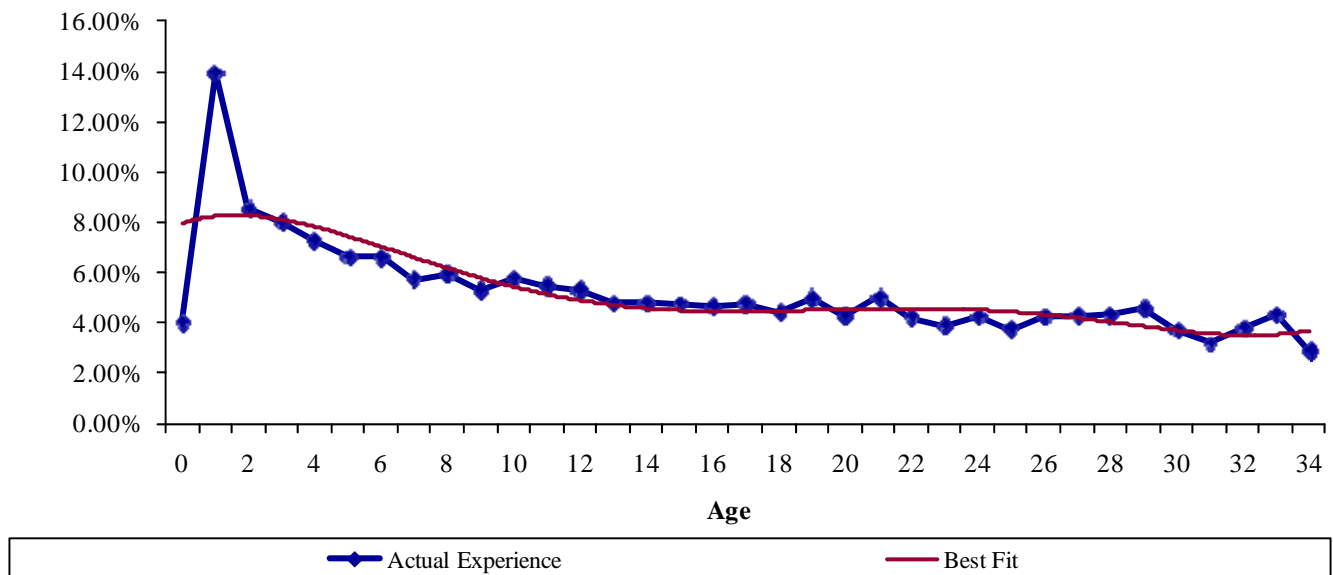
NON-UNIFORMED MEMBERS GROSS PAY INCREASE ASSUMPTIONS

The graphs shown below illustrate rates of gross salary increases for Non-Uniformed Members, according to age and service respectively. They demonstrate that rates of salary increases are highly correlated with age. New rates (merit and longevity portion only) are shown on the following page.

GROSS SALARY INCREASES – CORRELATION BY AGE



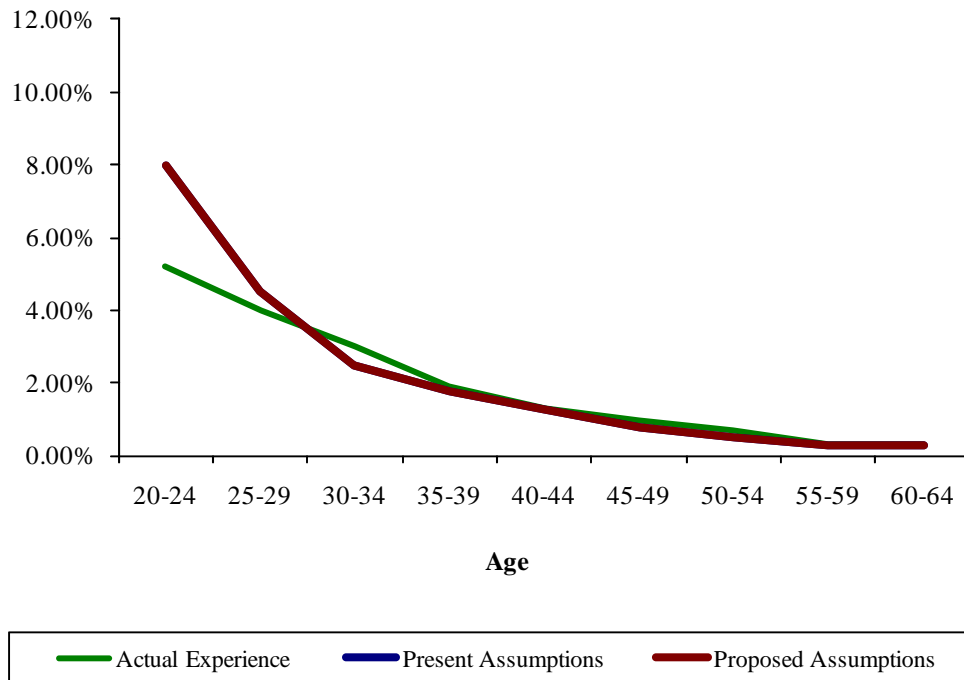
GROSS SALARY INCREASES – CORRELATION BY SERVICE



**NON-UNIFORMED MEMBERS
AGE-BASED MERIT & LONGEVITY PAY INCREASE ASSUMPTIONS**

Age Group Beginning of Year	Number	Actual	Expected	Proposed
20-24	107	5.19 %	8.00 %	8.00 %
25-29	1,511	3.98 %	4.50 %	4.50 %
30-34	2,839	3.02 %	2.50 %	2.50 %
35-39	4,012	1.92 %	1.75 %	1.75 %
40-44	5,263	1.30 %	1.25 %	1.25 %
45-49	6,348	0.94 %	0.75 %	0.75 %
50-54	4,780	0.70 %	0.50 %	0.50 %
55-59	2,682	0.31 %	0.30 %	0.30 %
60-64	839	0.31 %	0.30 %	0.30 %
65 & Over	140	0.17 %	0.30 %	0.30 %
Total	28,521			

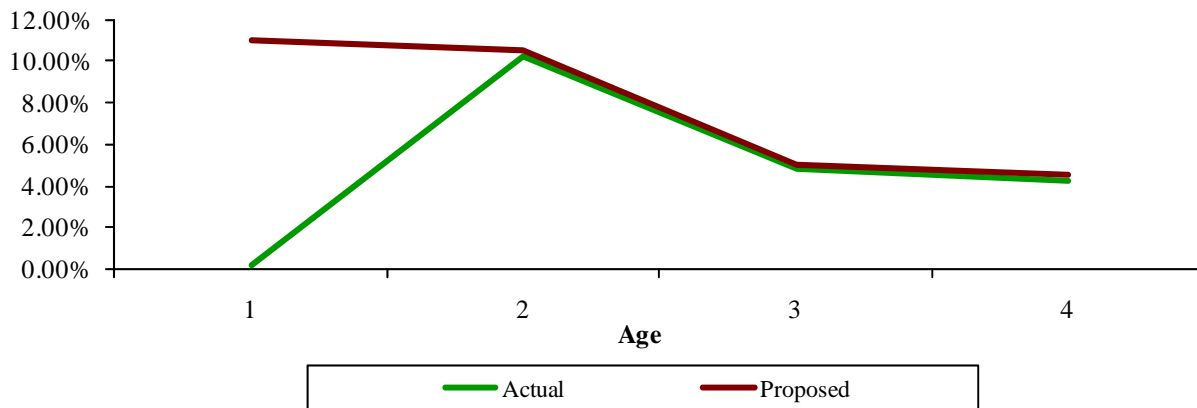
RATES OF SALARY INCREASES



NON-UNIFORMED MEMBERS
SERVICE-BASED MERIT & LONGEVITY PAY INCREASE ASSUMPTIONS

Service Index	Number	Actual	Expected	Proposed
1	1,674	0.23 %	N/A	11.00 %
2	2,053	10.21 %	N/A	10.50 %
3	1,630	4.81 %	N/A	5.00 %
4	1,671	4.25 %	N/A	4.50 %
Total	7,028			

RATES OF SALARY INCREASES



SECTION G

MORTALITY EXPERIENCE

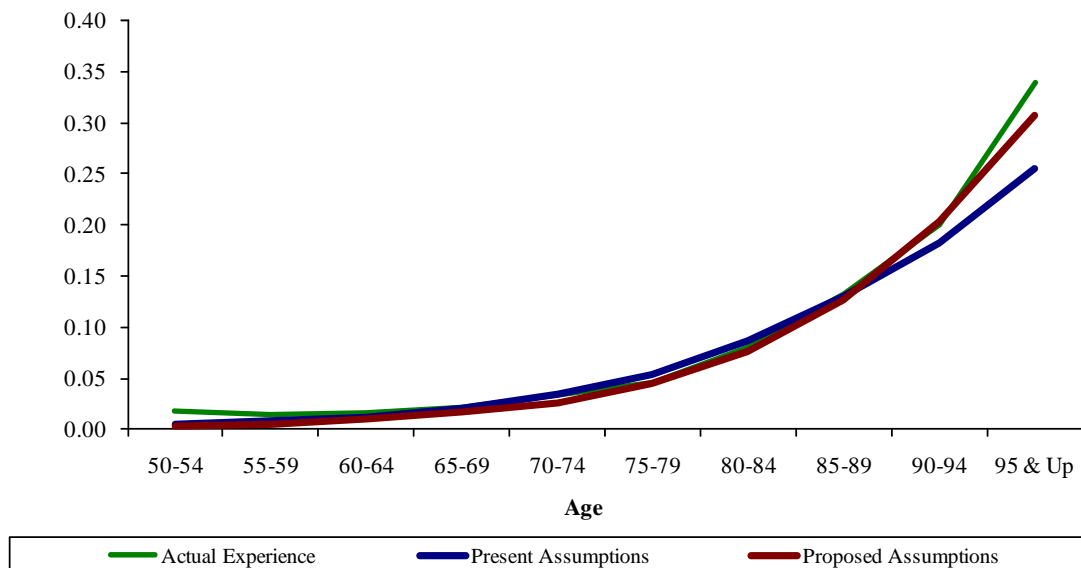
MALE RETIRED-LIFE MORTALITY EXPERIENCE (NORMAL & EARLY RETIREMENT, ORIGINAL ANNUITANTS ONLY)

There were 843 retired member deaths reported for the 5-year period and 23,214 life years of exposure included in the male retired-life mortality investigation. There were more deaths than expected among retired males. However, due to expected improvements in future life expectancy, we have reduced the rates of mortality. When looking at the experience from age 65 and later, we see that there are less deaths than expected. This also occurred in the prior experience study. Therefore we are reducing the rates to provide a margin for mortality improvement at these ages.

SUMMARY OF MALE RETIRED LIVES MORTALITY EXPERIENCE

Age	Life Years Exposure	Post-Retirement Death			Post-Retirement Death Rates		
		Actual Experience	Expected		Actual	Expected	
			Present	Proposed		Present	Proposed
50-54	813	15	4	3	0.0185	0.0049	0.0029
55-59	3,084	44	24	19	0.0143	0.0077	0.0053
60-64	4,591	72	56	50	0.0157	0.0120	0.0102
65-69	4,554	98	91	81	0.0215	0.0197	0.0170
70-74	4,069	134	138	114	0.0329	0.0342	0.0266
75-79	3,031	140	161	145	0.0462	0.0529	0.0455
80-84	1,842	148	157	147	0.0803	0.0865	0.0765
85-89	911	121	115	118	0.1328	0.1299	0.1269
90-94	269	54	47	54	0.2007	0.1829	0.2035
95 & Up	50	17	13	15	0.3400	0.2542	0.3074
Totals	23,214	843	806	746	0.0363	0.0347	0.0321
Total for 65 & Up	14,726	712	722	674	0.0483	0.0490	0.0458

RATES OF MALE RETIRED LIVES MORTALITY EXPERIENCE



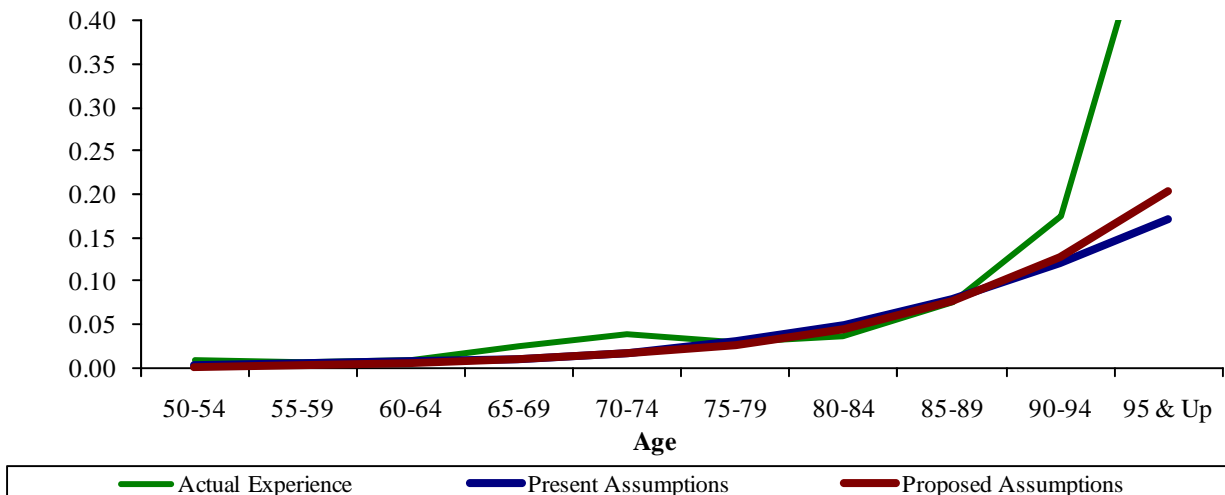
FEMALE RETIRED-LIFE MORTALITY EXPERIENCE (NORMAL & EARLY RETIREMENT, ORIGINAL ANNUITANTS ONLY)

There were 52 retired member deaths reported for the 5-year period and 2,058 life years of exposure included in the female retired-life mortality investigation. There were more deaths than expected among retired females. However, due to expected improvements in future life expectancy, we have reduced the rates of mortality.

SUMMARY OF FEMALE RETIRED LIVES MORTALITY EXPERIENCE

Age	Life Years Exposure	Post-Retirement Death			Post-Retirement Death Rates		
		Actual Experience	Expected		Actual	Expected	
			Present	Proposed		Present	Proposed
50-54	117	1	-	-	0.0085	0.0024	0.0017
55-59	334	2	1	1	0.0060	0.0044	0.0029
60-64	441	4	3	3	0.0091	0.0071	0.0053
65-69	438	11	5	5	0.0251	0.0109	0.0102
70-74	309	12	5	5	0.0388	0.0177	0.0170
75-79	202	6	6	6	0.0297	0.0307	0.0266
80-84	136	5	7	7	0.0368	0.0484	0.0455
85-89	53	4	4	4	0.0755	0.0787	0.0765
90-94	23	4	3	3	0.1739	0.1206	0.1269
95 & Up	5	3	1	1	0.6000	0.1713	0.2035
Totals	2,058	52	35	35	0.0253	0.0170	0.0170
Total for 65 & Up	1,166	45	31	31	0.0386	0.0266	0.0266

RATES OF FEMALE RETIRED LIVES MORTALITY EXPERIENCE



MALE DEATH-IN-SERVICE EXPERIENCE

There were 32 active male deaths reported for the 5-year period and 26,364 life years of exposure included in the male active mortality investigation.

MALE DEATHS

Age	Life Years Exposure	Post-Retirement Death			Post-Retirement Death Rates		
		Actual Experience	Expected		Actual	Expected	
			Present	Proposed		Present	Proposed
Under 30	1,120	-	-	-	0.0000	0.0000	0.0000
30-34	2,776	1	1	1	0.0004	0.0004	0.0005
35-39	4,044	4	2	3	0.0010	0.0005	0.0006
40-44	4,658	4	4	4	0.0009	0.0007	0.0008
45-49	5,444	8	7	7	0.0015	0.0014	0.0012
50-54	4,595	3	10	9	0.0007	0.0024	0.0020
55-59	2,662	5	9	10	0.0019	0.0038	0.0037
60-64	932	6	5	6	0.0064	0.0060	0.0071
65-69	133	1	1	1	0.0075	0.0099	0.0119
70-74	-	-	-	-	N/A	0.0171	0.0186
75 & Up	-	-	-	-	N/A	0.0264	0.0318
Totals	26,364	32	39	41	0.0012	0.0015	0.0016

FEMALE DEATH-IN-SERVICE EXPERIENCE

There were 4 active female deaths reported for the 5-year period and 7,843 life years of exposure included in the female active mortality investigation.

FEMALE DEATHS

Age	Life Years Exposure	Post-Retirement Death			Post-Retirement Death Rates		
		Actual Experience	Expected		Actual	Expected	
			Present	Proposed		Present	Proposed
Under 30	351	-	-	-	0.0000	0.0000	0.0000
30-34	724	-	-	-	0.0000	0.0003	0.0003
35-39	1,159	-	-	-	0.0000	0.0003	0.0003
40-44	1,459	-	1	1	0.0000	0.0005	0.0004
45-49	1,668	-	1	1	0.0000	0.0007	0.0006
50-54	1,277	4	1	1	0.0031	0.0012	0.0008
55-59	825	-	2	1	0.0000	0.0022	0.0014
60-64	328	-	1	1	0.0000	0.0035	0.0027
65-69	52	-	-	-	0.0000	0.0054	0.0051
70-74	-	-	-	-	N/A	0.0088	0.0085
75 & Up	-	-	-	-	N/A	0.0153	0.0133
Totals	7,843	4	6	5	0.0005	0.0008	0.0006

MALE DISABLED MORTALITY EXPERIENCE

There were 24 disabled retired male deaths reported for the 5-year period and 407 life years of exposure included in the male disabled mortality investigation.

MALE DEATHS

Age	Life Years Exposure	Post-Retirement Death			Post-Retirement Death Rates		
		Actual Experience	Expected		Actual	Expected	
			Present	Proposed		Present	Proposed
50-54	110	7	5	4	0.0636	0.0420	0.0399
55-59	138	5	7	7	0.0362	0.0531	0.0504
60-64	73	3	5	4	0.0411	0.0643	0.0611
65-69	29	-	2	2	0.0000	0.0697	0.0662
70-74	18	1	1	1	0.0556	0.0776	0.0737
75-79	13	3	1	1	0.2308	0.0908	0.0863
80-84	13	1	2	2	0.0769	0.1322	0.1256
85-89	8	3	2	2	0.3750	0.1980	0.1881
90-94	3	-	1	1	0.0000	0.2972	0.2823
95 & Up	2	1	1	1	0.5000	0.3850	0.5000
Totals	407	24	27	25	0.0590	0.0663	0.0614

FEMALE DISABLED MORTALITY EXPERIENCE

There were 5 disabled retired female deaths reported for the 5-year period and 106 life years of exposure included in the female disabled mortality investigation.

FEMALE DEATHS

Age	Life Years Exposure	Post-Retirement Death			Post-Retirement Death Rates		
		Actual Experience	Expected		Actual	Expected	
			Present	Proposed		Present	Proposed
50-54	49	1	1	1	0.0204	0.0272	0.0272
55-59	34	1	1	1	0.0294	0.0307	0.0307
60-64	19	2	1	1	0.1053	0.0347	0.0347
65-69	4	1	-	-	0.2500	0.0386	0.0386
70-74	-	-	-	-	N\A	0.0433	0.0433
75-79	-	-	-	-	N\A	0.0578	0.0578
80-84	-	-	-	-	N\A	0.0885	0.0885
85-89	-	-	-	-	N\A	0.1322	0.1322
90-94	-	-	-	-	N\A	0.1980	0.1980
95 & Up	-	-	-	-	N\A	0.4458	0.4458
Totals	106	5	3	3	0.0472	0.0283	0.0283

SECTION H

NEW ASSUMPTION LISTING

**ACTUARIAL ASSUMPTIONS
BASED ON 2004-2009 EXPERIENCE STUDY**

SELECT AND ULTIMATE WITHDRAWAL

Age	Service	% of Active Participants Withdrawing			
		Uniformed Members		Non-Uniformed Members	
		Male	Female	Male	Female
	0-1	14.0%	14.0%	30.0%	19.0%
	1-2	6.5%	6.5%	16.0%	13.0%
	2-3	3.5%	3.5%	8.0%	9.0%
	3-4	3.0%	3.0%	6.5%	8.0%
	4-5	3.0%	3.0%	5.0%	5.0%
30	5 & Up	2.8%	2.8%	4.4%	5.1%
31		2.6%	2.6%	4.2%	5.1%
32		2.5%	2.5%	4.0%	5.1%
33		2.4%	2.4%	3.9%	4.9%
34		2.2%	2.2%	3.7%	4.8%
35		2.1%	2.1%	3.5%	4.6%
36		1.9%	1.9%	3.4%	4.4%
37		1.8%	1.8%	3.2%	4.3%
38		1.6%	1.6%	3.1%	4.1%
39		1.5%	1.5%	2.9%	3.9%
40		1.4%	1.4%	2.7%	3.7%
41		1.3%	1.3%	2.6%	3.6%
42		1.2%	1.2%	2.5%	3.4%
43		1.1%	1.1%	2.3%	3.2%
44		1.0%	1.0%	2.2%	3.1%
45		0.9%	0.9%	2.1%	2.9%
46		0.8%	0.8%	1.9%	2.7%
47		0.7%	0.7%	1.8%	2.5%
48		0.5%	0.5%	1.7%	2.4%
49		0.5%	0.5%	1.6%	2.2%
50		0.4%	0.4%	1.5%	2.0%
51		0.4%	0.4%	1.4%	1.9%
52		0.3%	0.3%	1.3%	1.7%
53		0.3%	0.3%	1.2%	1.5%
54		0.2%	0.2%	1.2%	1.4%
55		0.2%	0.2%	1.1%	1.2%
56		0.1%	0.1%	1.1%	1.0%
57		0.1%	0.1%	1.0%	0.8%
58		0.1%	0.1%	1.0%	0.7%
59		0.1%	0.1%	0.9%	0.5%
60		0.1%	0.1%	0.9%	0.3%
Ref		633	633	631	632
		387	387	63	684
		55%	55%	60%	85%

**ACTUARIAL ASSUMPTIONS
BASED ON 2004-2009 EXPERIENCE STUDY**

DISABILITY RATES

Age	% of Active Participants Becoming Disabled			
	Uniformed Members		Non-Uniformed Members	
	Male	Female	Male	Female
20	0.00%	0.00%	0.02%	0.03%
21	0.00%	0.00%	0.02%	0.03%
22	0.00%	0.00%	0.02%	0.03%
23	0.00%	0.00%	0.02%	0.03%
24	0.00%	0.00%	0.02%	0.05%
25	0.01%	0.01%	0.02%	0.05%
26	0.01%	0.01%	0.02%	0.05%
27	0.01%	0.01%	0.03%	0.06%
28	0.02%	0.02%	0.03%	0.08%
29	0.02%	0.02%	0.03%	0.10%
30	0.02%	0.02%	0.03%	0.10%
31	0.02%	0.02%	0.04%	0.11%
32	0.02%	0.02%	0.04%	0.13%
33	0.02%	0.02%	0.05%	0.14%
34	0.02%	0.02%	0.05%	0.14%
35	0.02%	0.02%	0.06%	0.14%
36	0.02%	0.02%	0.06%	0.16%
37	0.03%	0.03%	0.06%	0.16%
38	0.03%	0.03%	0.07%	0.18%
39	0.04%	0.04%	0.08%	0.18%
40	0.05%	0.05%	0.10%	0.19%
41	0.06%	0.06%	0.13%	0.22%
42	0.06%	0.06%	0.15%	0.24%
43	0.07%	0.07%	0.16%	0.27%
44	0.08%	0.08%	0.19%	0.29%
45	0.09%	0.09%	0.23%	0.32%
46	0.11%	0.11%	0.28%	0.35%
47	0.12%	0.12%	0.33%	0.37%
48	0.14%	0.14%	0.37%	0.38%
49	0.16%	0.16%	0.40%	0.40%
50	0.19%	0.19%	0.42%	0.42%
51	0.22%	0.22%	0.43%	0.45%
52	0.24%	0.24%	0.44%	0.48%
53	0.28%	0.28%	0.47%	0.53%
54	0.31%	0.31%	0.50%	0.59%
55	0.35%	0.35%	0.54%	0.66%
56	0.39%	0.39%	0.59%	0.70%
57	0.43%	0.43%	0.64%	0.77%
58	0.48%	0.48%	0.73%	0.82%
59	0.52%	0.52%	0.83%	0.85%
60	0.58%	0.58%	1.00%	0.90%
Ref	19	19	188	503
Multiplier	75%	75%	110%	160%

**ACTUARIAL ASSUMPTIONS
BASED ON 2004-2009 EXPERIENCE STUDY**

SALARY SCALE – AGE BASED RATES

Age	% Merit Increases in Salaries Next Year	
	Uniformed Members	Non-Uniformed Members
20	8.5%	8.0%
21	8.5%	8.0%
22	8.5%	8.0%
23	7.8%	7.3%
24	7.0%	6.5%
25	6.2%	5.7%
26	5.2%	4.7%
27	5.0%	4.5%
28	4.6%	4.1%
29	4.2%	3.7%
30	3.8%	3.3%
31	3.4%	2.9%
32	3.0%	2.5%
33	2.8%	2.3%
34	2.7%	2.2%
35	2.6%	2.1%
36	2.4%	1.9%
37	2.3%	1.8%
38	2.1%	1.6%
39	2.0%	1.5%
40	1.9%	1.4%
41	1.9%	1.4%
42	1.8%	1.3%
43	1.7%	1.2%
44	1.5%	1.0%
45	1.4%	0.9%
46	1.4%	0.9%
47	1.2%	0.7%
48	1.2%	0.7%
49	1.2%	0.7%
50	1.1%	0.6%
51	1.0%	0.5%
52	1.0%	0.5%
53	1.0%	0.5%
54	0.9%	0.4%
55	0.9%	0.4%
56	0.8%	0.3%
57	0.8%	0.3%
58	0.8%	0.3%
59	0.8%	0.3%
60	0.8%	0.3%
61	0.8%	0.3%
62	0.8%	0.3%
63	0.8%	0.3%
64	0.8%	0.3%
65	0.8%	0.3%
66	0.8%	0.3%
67	0.8%	0.3%
68	0.8%	0.3%
69	0.8%	0.3%
70	0.8%	0.3%
Ref	161	161
	0.50%	

ACTUARIAL ASSUMPTIONS
BASED ON 2004-2009 EXPERIENCE STUDY

SALARY SCALE – SERVICE BASED RATES

% Merit Increases in Salaries Next Year	
Service Index	Rate
1	11.0%
2	10.5%
3	5.0%
4	4.5%
Ref	339

**ACTUARIAL ASSUMPTIONS
 BASED ON 2004-2009 EXPERIENCE STUDY**

NORMAL RETIREMENT PATTERN

Age	% of Active Participants Retiring			
	Uniformed Members		Non-Uniformed Members	
	Male	Female	Male	Female
50	40%	40%	30%	30%
51	20%	20%	25%	18%
52	15%	15%	25%	18%
53	15%	15%	20%	18%
54	15%	15%	20%	25%
55	25%	25%	20%	30%
56	25%	25%	30%	30%
57	30%	30%	25%	30%
58	35%	35%	20%	30%
59	50%	50%	25%	30%
60	100%	100%	20%	20%
61	100%	100%	15%	20%
62	100%	100%	50%	35%
63	100%	100%	40%	25%
64	100%	100%	30%	25%
65	100%	100%	40%	40%
66	100%	100%	45%	40%
67	100%	100%	25%	40%
68	100%	100%	25%	40%
69	100%	100%	25%	40%
70	100%	100%	50%	50%
71	100%	100%	50%	50%
72	100%	100%	100%	100%
Ref	1826	1826	1822	1823

**ACTUARIAL ASSUMPTIONS
 BASED ON 2004-2009 EXPERIENCE STUDY**

EARLY RETIREMENT PATTERN

Age	% of Active Participants Retiring	
	Non-Uniformed Members	
	Male	Female
55	3%	3%
56	3%	3%
57	4%	3%
58	4%	3%
59	5%	3%
60	10%	5%
61	4%	6%
62	40%	40%
63	40%	30%
64	40%	30%
Ref	1824	1825

**ACTUARIAL ASSUMPTIONS
 BASED ON 2004-2009 EXPERIENCE STUDY**

RETIRED LIVES MORTALITY RATES

Age	% Dying Next Year		Age	% Dying Next Year		Age	% Dying Next Year	
	Male	Female		Male	Female		Male	Female
20	0.0396%	0.0324%	60	0.7846%	0.4124%	100	35.8830%	25.9380%
21	0.0418%	0.0343%	61	0.8958%	0.4712%	101	38.0735%	27.8936%
22	0.0441%	0.0357%	62	1.0151%	0.5345%	102	40.4426%	29.7614%
23	0.0468%	0.0368%	63	1.1441%	0.6062%	103	42.7883%	31.6630%
24	0.0500%	0.0381%	64	1.2870%	0.6912%	104	44.9085%	33.8758%
25	0.0523%	0.0396%	65	1.4291%	0.7846%	105	46.6012%	35.8830%
26	0.0543%	0.0418%	66	1.5614%	0.8958%	106	47.8582%	38.0735%
27	0.0564%	0.0441%	67	1.7000%	1.0151%	107	48.8140%	40.4426%
28	0.0588%	0.0468%	68	1.8396%	1.1441%	108	49.4813%	42.7883%
29	0.0612%	0.0500%	69	2.0025%	1.2870%	109	49.8724%	44.9085%
30	0.0633%	0.0523%	70	2.2026%	1.4291%	110	50.0000%	46.6012%
31	0.0649%	0.0543%	71	2.4187%	1.5614%	111	50.0000%	47.8582%
32	0.0661%	0.0564%	72	2.6581%	1.7000%	112	50.0000%	48.8140%
33	0.0675%	0.0588%	73	2.9310%	1.8396%	113	50.0000%	49.4813%
34	0.0695%	0.0612%	74	3.2392%	2.0025%	114	50.0000%	49.8724%
35	0.0727%	0.0633%	75	3.6288%	2.2026%	115	50.0000%	50.0000%
36	0.0768%	0.0649%	76	4.0636%	2.4187%	116	50.0000%	50.0000%
37	0.0819%	0.0661%	77	4.5463%	2.6581%	117	50.0000%	50.0000%
38	0.0879%	0.0675%	78	5.0795%	2.9310%	118	100.0000%	50.0000%
39	0.0944%	0.0695%	79	5.6655%	3.2392%	119	100.0000%	50.0000%
40	0.1014%	0.0727%	80	6.3064%	3.6288%	120	100.0000%	100.0000%
41	0.1083%	0.0768%	81	6.9481%	4.0636%			
42	0.1151%	0.0819%	82	7.6539%	4.5463%			
43	0.1224%	0.0879%	83	8.4129%	5.0795%			
44	0.1312%	0.0944%	84	9.2686%	5.6655%			
45	0.1422%	0.1014%	85	10.3014%	6.3064%			
46	0.1554%	0.1083%	86	11.4434%	6.9481%			
47	0.1699%	0.1151%	87	12.6925%	7.6539%			
48	0.1869%	0.1224%	88	14.0650%	8.4129%			
49	0.2065%	0.1312%	89	15.4664%	9.2686%			
50	0.2302%	0.1422%	90	17.0190%	10.3014%			
51	0.2571%	0.1554%	91	18.6631%	11.4434%			
52	0.2854%	0.1699%	92	20.3518%	12.6925%			
53	0.3197%	0.1869%	93	22.2123%	14.0650%			
54	0.3614%	0.2065%	94	24.0233%	15.4664%			
55	0.4124%	0.2302%	95	25.9380%	17.0190%			
56	0.4712%	0.2571%	96	27.8936%	18.6631%			
57	0.5345%	0.2854%	97	29.7614%	20.3518%			
58	0.6062%	0.3197%	98	31.6630%	22.2123%			
59	0.6912%	0.3614%	99	33.8758%	24.0233%			

Ref 303 x 100% 303 x 100%

Set Back -2 3

**ACTUARIAL ASSUMPTIONS
 BASED ON 2004-2009 EXPERIENCE STUDY**

DEATH-IN-SERVICE RATES

% Dying Next Year			% Dying Next Year			% Dying Next Year		
Age	Male	Female	Age	Male	Female	Age	Male	Female
20	0.0277%	0.0162%	60	0.5492%	0.2062%	100	25.1181%	12.9690%
21	0.0293%	0.0171%	61	0.6271%	0.2356%	101	26.6515%	13.9468%
22	0.0309%	0.0179%	62	0.7106%	0.2672%	102	28.3098%	14.8807%
23	0.0328%	0.0184%	63	0.8009%	0.3031%	103	29.9518%	15.8315%
24	0.0350%	0.0190%	64	0.9009%	0.3456%	104	31.4359%	16.9379%
25	0.0366%	0.0198%	65	1.0004%	0.3923%	105	32.6208%	17.9415%
26	0.0380%	0.0209%	66	1.0930%	0.4479%	106	33.5007%	19.0368%
27	0.0395%	0.0221%	67	1.1900%	0.5075%	107	34.1698%	20.2213%
28	0.0412%	0.0234%	68	1.2877%	0.5720%	108	34.6369%	21.3941%
29	0.0428%	0.0250%	69	1.4017%	0.6435%	109	34.9107%	22.4542%
30	0.0443%	0.0262%	70	1.5418%	0.7145%	110	35.0000%	23.3006%
31	0.0454%	0.0272%	71	1.6931%	0.7807%	111	35.0000%	23.9291%
32	0.0463%	0.0282%	72	1.8607%	0.8500%	112	35.0000%	24.4070%
33	0.0473%	0.0294%	73	2.0517%	0.9198%	113	35.0000%	24.7406%
34	0.0486%	0.0306%	74	2.2674%	1.0012%	114	35.0000%	24.9362%
35	0.0509%	0.0316%	75	2.5402%	1.1013%	115	35.0000%	25.0000%
36	0.0538%	0.0324%	76	2.8445%	1.2094%	116	35.0000%	25.0000%
37	0.0573%	0.0331%	77	3.1824%	1.3291%	117	35.0000%	25.0000%
38	0.0615%	0.0338%	78	3.5557%	1.4655%	118	70.0000%	25.0000%
39	0.0661%	0.0347%	79	3.9659%	1.6196%	119	100.0000%	25.0000%
40	0.0710%	0.0364%	80	4.4145%	1.8144%	120	100.0000%	100.0000%
41	0.0758%	0.0384%	81	4.8637%	2.0318%			
42	0.0806%	0.0410%	82	5.3577%	2.2731%			
43	0.0857%	0.0439%	83	5.8890%	2.5398%			
44	0.0918%	0.0472%	84	6.4880%	2.8328%			
45	0.0995%	0.0507%	85	7.2110%	3.1532%			
46	0.1088%	0.0541%	86	8.0104%	3.4741%			
47	0.1189%	0.0576%	87	8.8848%	3.8270%			
48	0.1308%	0.0612%	88	9.8455%	4.2064%			
49	0.1445%	0.0656%	89	10.8265%	4.6343%			
50	0.1611%	0.0711%	90	11.9133%	5.1507%			
51	0.1800%	0.0777%	91	13.0642%	5.7217%			
52	0.1998%	0.0850%	92	14.2463%	6.3463%			
53	0.2238%	0.0935%	93	15.5486%	7.0325%			
54	0.2530%	0.1032%	94	16.8163%	7.7332%			
55	0.2887%	0.1151%	95	18.1566%	8.5095%			
56	0.3298%	0.1286%	96	19.5255%	9.3315%			
57	0.3741%	0.1427%	97	20.8330%	10.1759%			
58	0.4243%	0.1598%	98	22.1641%	11.1061%			
59	0.4838%	0.1807%	99	23.7131%	12.0117%			

Ref 303 x 70% 303 x 50%

Set Back -2 3

March 17, 2010

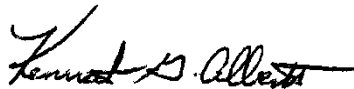
Ms. Susie Dahl
Executive Director
Missouri Department of Transportation and
Highway Patrol Employees' Retirement System
1913 William Street
Jefferson City, MO 65109

Re: 2004 – 2009 MPERS Experience Study

Dear Susie:

Enclosed are 25 spiral bound copies of the report and one 3-hole punched copy of the 2004 – 2009 MPERS Experience Study.

Sincerely,



Kenneth G. Alberts

KGA/bd
Enclosures

cc: Brian Murphy