

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF PROVIDENCE  
EXPERIENCE INVESTIGATION  
FOR THE FIVE YEAR PERIOD  
ENDING JUNE 30, 2011**

April 2, 2012

Retirement Board  
Employees' Retirement System of the  
City of Providence  
City Hall  
25 Dorrance Street  
Providence, RI 02903

Members of the Board:

Submitted in this report are the results of an investigation of economic and demographic (non-economic) experience for the Employees' Retirement System of the City of Providence. The purpose of the investigation was to assess the reasonability of the service retirement, withdrawal, mortality and disability decrements. The report also includes a review of the System's economic assumptions, including the interest rate and salary increase rates, and also reviews current actuarial methods, such as the asset valuation method and the funding (cost) method (including the amortization of the unfunded liability).

The investigation was based upon the statistical data furnished for the annual actuarial valuations and covers the five-year period from July 1, 2006 through June 30, 2011. The recommendations rely on the accuracy and completeness of the data supplied.

The demographic assumption experience investigation has been prepared under the supervision of Philip Bonanno. The review of the System's economic assumptions and methods has been prepared under the supervision of Philip Bonanno and Stuart Schulman. Both Mr. Bonanno and Mr. Schulman are members of the American Academy of Actuaries who have met the qualification standards of the American Academy of Actuaries to render the opinions contained herein.

The Table of Contents, which immediately follows, outlines the material contained in this report.

Respectfully submitted,



Philip Bonanno, ASA, EA, MAAA, FCA  
Director, Consulting Actuary



Stuart M. Schulman, FSA, CFA, EA, MAAA  
Director, Consulting Actuary

## **TABLE OF CONTENTS**

<u>Item</u>	<u>Page No.</u>
Summary of Findings	1
28 Year Appropriation Forecasts	4
Introduction	6
Methodology	7
Experience Investigation Results:	
Investment Return Results	8
Determination of Economic Assumptions	8
Results and Conclusions for Class A	11
Results and Conclusions for Class B	26
Appendices:	
A - Complete Set of Proposed Assumptions - Class A	40
B - Complete Set of Proposed Assumptions - Class B	44

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF PROVIDENCE**  
**EXPERIENCE INVESTIGATION**

**Summary of Findings**

The five-year period (July 1, 2006 to June 30, 2011) covered by this experience investigation provided sufficient data to form a basis for recommending changes in the demographic and economic assumptions used in the actuarial valuations of the Employees' Retirement System of the City of Providence.

The recommended changes in actuarial assumptions resulting from this experience investigation are summarized below. We recommend that these proposed changes first be reflected in the June 30, 2012 actuarial valuation of the System.

**Demographic Changes:**

**Class A:**

- Actives:
- For withdrawal, increase the rates at most ages to better reflect actual occurrences.
  - For pre-retirement mortality, use the same mortality tables as those used for post-retirement mortality.
  - For disability retirements, decrease the rates at most ages to better reflect actual occurrences.
  - For service retirements, have one set of age-related rates for those with less than ten years of service and another for those with at least ten years of service (due to ten year eligibility in addition to age requirement for retiree medical benefits) and adjust the rates at certain ages to better reflect actual occurrences.

- Pensioners:
- No changes

**Class B:**

- Actives:
- For withdrawal, increase the rates at most ages to better reflect actual occurrences.
  - For pre-retirement mortality, use the same mortality tables as those used for post-retirement mortality.
  - For service retirements, adjust the rates at certain ages to better reflect actual occurrences.
  - Decrease the purchased service load from 0.63 years to 0.50 years for Fire and from 2.11 years to 1.00 year for Police.

- Pensioners:**
- For service retirements, change the mortality table to be the RP-2000 Combined Healthy Mortality Table with Blue Collar Adjustment, with static projection to 2021 using Scale AA.

- Economic Changes:**
- No change in discount rate
  - Reduce the payroll growth assumption from 5.00% to 3.50%, which will increase the unfunded accrued liability amortization payments (and therefore the Annual Required Contribution) as discussed later in the report.

- Actuarial Methods:**
- No changes are recommended in actuarial funding (cost) method or the asset valuation method.

The tables below highlight the impact on certain valuation results if the recommended demographic and economic assumption changes listed on the previous page had been in place for the June 30, 2011 valuation.

**Class A:**

Item	June 30, 2011 Valuation Results	With Demographic Assumption Changes	With Demographic and Economic Changes
Accrued Liability	\$398.9 million	\$397.2 million	\$397.2 million
Valuation Assets	127.4 million	128.1 million	128.1 million
Unfunded Accrued Liability	271.5 million	269.1 million	269.1 million
Annual Required Contribution (\$)	20.0 million	19.5 million	22.3 million
Annual Required Contribution (%)	24.44%	23.83%	27.16%

**Class B:**

Item	June 30, 2011 Valuation Results	With Demographic Assumption Changes	With Demographic and Economic Changes
Accrued Liability	\$924.9 million	\$913.3 million	\$913.3 million
Valuation Assets	295.4 million	294.7 million	294.7 million
Unfunded Accrued Liability	629.5 million	618.6 million	618.6 million
Annual Required Contribution (\$)	44.8 million	43.6 million	49.8 million
Annual Required Contribution (%)	83.60%	81.35%	93.06%

**Total:**

Item	June 30, 2011 Valuation Results	With Demographic Assumption Changes	With Demographic and Economic Changes
Accrued Liability	\$1,323.8 million	\$1,310.5 million	\$1,310.5 million
Valuation Assets	422.8 million	422.8 million	422.8 million
Unfunded Accrued Liability	901.0 million	887.7 million	887.7 million
Annual Required Contribution (\$)	64.8 million	63.1 million	72.1 million
Annual Required Contribution (%)	47.82%	46.56%	53.20%

**CITY OF PROVIDENCE**

**Appropriation Forecast With Demographic Assumption Changes**

<b>Fiscal Year Ending</b>	<b>Normal Cost</b>	<b>Past Service Amortization</b>	<b>Deferral Amortization</b>	<b>Total</b>	<b>Pay-As-You-Go</b>
6/30/2012	\$ 9,489,420	\$ 48,946,899	\$ 492,606	\$ 58,928,925	\$ 85,808,469
6/30/2013	10,585,149	52,017,091	471,667	63,073,907	89,360,733
6/30/2014	11,008,555	54,617,946	471,667	66,098,168	92,955,445
6/30/2015	11,448,897	57,348,843	471,667	69,269,407	96,643,433
6/30/2016	11,906,853	60,216,285	471,667	72,594,805	100,323,922
6/30/2017	12,383,127	63,227,099	471,667	76,081,893	104,101,356
6/30/2018	12,878,452	66,388,454	471,667	79,738,573	108,020,673
6/30/2019	13,393,590	69,707,877	471,667	83,573,134	111,898,924
6/30/2020	13,929,334	73,193,271	471,667	87,594,272	115,726,777
6/30/2021	14,486,507	76,852,935	471,667	91,811,109	119,536,558
6/30/2022	15,065,967	80,695,582	471,667	96,233,216	123,338,330
6/30/2023	15,668,606	84,730,361	471,667	100,870,634	127,177,625
6/30/2024	16,295,350	88,966,879	471,667	105,733,896	130,774,536
6/30/2025	16,947,164	93,415,223	471,667	110,834,054	134,259,638
6/30/2026	17,625,051	98,085,984	471,667	116,182,702	137,437,524
6/30/2027	18,330,053	102,990,283	471,667	121,792,003	140,398,107
6/30/2028	19,063,255	108,139,797	471,667	127,674,719	143,135,321
6/30/2029	19,825,785	113,546,787	471,667	133,844,239	145,597,843
6/30/2030	20,618,816	119,224,126	471,667	140,314,609	147,786,327
6/30/2031	21,443,569	125,185,332	471,667	147,100,568	149,668,818
6/30/2032	22,301,312	131,444,599	-	153,745,911	151,157,589
6/30/2033	23,193,364	138,016,829	-	161,210,193	152,164,662
6/30/2034	24,121,099	144,917,670	-	169,038,769	152,630,209
6/30/2035	25,085,943	152,163,554	-	177,249,497	152,588,833
6/30/2036	26,089,381	159,771,732	-	185,861,113	152,056,865
6/30/2037	27,132,956	167,760,319	-	194,893,275	151,144,825
6/30/2038	28,218,274	176,148,335	-	204,366,609	149,764,938
6/30/2039	29,347,005	184,955,752	-	214,302,757	147,975,870
6/30/2040	30,520,885	194,203,540	-	224,724,425	145,799,581
6/30/2041	31,741,720	-	-	31,741,720	143,172,629
6/30/2042	33,011,389	-	-	33,011,389	140,162,867

**CITY OF PROVIDENCE**

**Appropriation Forecast With Demographic And Economic Assumption Changes**

<b>Fiscal Year Ending</b>	<b>Normal Cost</b>	<b>Past Service Amortization</b>	<b>Deferral Amortization</b>	<b>Total</b>	<b>Pay-As-You-Go</b>
6/30/2012	\$ 9,489,420	\$ 48,946,899	\$ 492,606	\$ 58,928,925	\$ 85,808,469
6/30/2013	10,585,149	61,014,303	471,667	72,071,119	89,360,733
6/30/2014	11,008,555	63,149,804	471,667	74,630,026	92,955,445
6/30/2015	11,448,897	65,360,047	471,667	77,280,611	96,643,433
6/30/2016	11,906,853	67,647,649	471,667	80,026,169	100,323,922
6/30/2017	12,383,127	70,015,317	471,667	82,870,111	104,101,356
6/30/2018	12,878,452	72,465,853	471,667	85,815,972	108,020,673
6/30/2019	13,393,590	75,002,158	471,667	88,867,415	111,898,924
6/30/2020	13,929,334	77,627,234	471,667	92,028,235	115,726,777
6/30/2021	14,486,507	80,344,187	471,667	95,302,361	119,536,558
6/30/2022	15,065,967	83,156,234	471,667	98,693,868	123,338,330
6/30/2023	15,668,606	86,066,702	471,667	102,206,975	127,177,625
6/30/2024	16,295,350	89,079,037	471,667	105,846,054	130,774,536
6/30/2025	16,947,164	92,196,803	471,667	109,615,634	134,259,638
6/30/2026	17,625,051	95,423,691	471,667	113,520,409	137,437,524
6/30/2027	18,330,053	98,763,520	471,667	117,565,240	140,398,107
6/30/2028	19,063,255	102,220,243	471,667	121,755,165	143,135,321
6/30/2029	19,825,785	105,797,952	471,667	126,095,404	145,597,843
6/30/2030	20,618,816	109,500,880	471,667	130,591,363	147,786,327
6/30/2031	21,443,569	113,333,411	471,667	135,248,647	149,668,818
6/30/2032	22,301,312	117,300,080	-	139,601,392	151,157,589
6/30/2033	23,193,364	121,405,583	-	144,598,947	152,164,662
6/30/2034	24,121,099	125,654,778	-	149,775,877	152,630,209
6/30/2035	25,085,943	130,052,695	-	155,138,638	152,588,833
6/30/2036	26,089,381	134,604,539	-	160,693,920	152,056,865
6/30/2037	27,132,956	139,315,698	-	166,448,654	151,144,825
6/30/2038	28,218,274	144,191,747	-	172,410,021	149,764,938
6/30/2039	29,347,005	149,238,458	-	178,585,463	147,975,870
6/30/2040	30,520,885	154,461,804	-	184,982,689	145,799,581
6/30/2041	31,741,720	-	-	31,741,720	143,172,629
6/30/2042	33,011,389	-	-	33,011,389	140,162,867



Note in the tables above that the asset value for each class changes in each scenario. The methodology for allocating assets to Class A and Class B is to apportion the System's total assets in the same proportion as their respective accrued liabilities are to the total accrued liability.

## **Introduction**

The methodology, results and conclusions of the five-year experience investigation of the economic and demographic assumptions of the Retirement System are described below.

The objectives of the investigation are to:

- Determine appropriate economic assumptions, including investment return, inflation and cost-of-living adjustments.
  
- Determine appropriate rates to anticipate the following events among active members:
  - termination from employment;
  - mortality during active service;
  - disability retirement;
  - service retirement; and
  - salary increases
  
- Determine appropriate rates to anticipate mortality among service retirees, beneficiaries and disability retirees.
  
- Review actuarial methods:
  - funding (cost) method
  - asset valuation method

## **Methodology**

Data is supplied annually to the actuary by the System for purposes of the actuarial valuation report. This data includes demographic characteristics of the current and past membership, including any changes in the members' status or relationship with the System. The data also includes a salary history for active members. These demographic changes and salary history are the basis for the experience review.

Tabulations were compiled which show age or service distributions of the number of members who were **exposed** during the five-year period to the events of termination from employment, retirement, death and disability. A member is considered exposed to an event if the member meets the age and service requirements for that event. The assumed rates of occurrence for each event, which are currently used in the annual actuarial valuations, were then applied to the number of members exposed to determine the number of members **expected** to separate from service for each category.

The **actual** number of members who separated from service due to termination from employment, retirement, death or disability was then compared to the expected number. The results were then expressed as a ratio of actual experience over expected experience. In some instances a high ratio is favorable for the financial experience of the System and in others, a high ratio is unfavorable. Data is generally grouped by age or service in five-year increments to provide statistically significant results.

The expected and actual salaries as of the end of each year were also compared to actual salaries as of the end of each previous year. The comparisons show an average annual total increase in both expected and actual salaries for the five-year period.

The results of the experience review are the basis for the actuary's recommendation of assumption changes. In recommending assumptions the actuary must also take into account special plan benefits and past economic factors.

In addition to comparing actual to expected experience and adjusting the results for special plan benefits and past economic conditions, the actuary must consider future expectations of experience due to future plan changes or changes in the economy.

To summarize, the actuary's recommendation of assumptions is based on the following:

- comparison of actual to expected experience,
- adjustment for special plan benefits and past economic conditions, and
- adjustment for future plan changes and economic conditions.

Generally, actuarial assumptions are selected with a slight margin for adverse experience so that the financial strength of the System can be maintained.

### **Investment Return Results**

Historical experience and projected future returns were used when evaluating the System's current economic assumptions. The investment return of the assets of the System over the July 1, 2006 to June 30, 2011 period was as follows:

<b>Fiscal Year Ended June 30</b>	<b>Total Return on Assets</b>		
	<b>Actuarial Value</b>	<b>Market Value</b>	<b>Inflation</b>
2007	11.24%	16.26%	2.69%
2008	9.90	2.85	5.02
2009	(6.35)	(13.42)	(1.43)
2010	10.55	12.80	1.05
2011	3.42	21.33	3.56
Arithmetic Average	5.75%	7.96%	2.18%
Geometric Average	5.53%	7.22%	2.15%

### **Determination of the Valuation Interest / Discount Rate**

The expected investment income is based on the System's assumed interest rate. The current interest rate assumption is 8.25%, which is higher than the 5.75% five-year actuarial rate of return reported above. Interest rate assumptions are based on two components: real rate of return and inflation. Due to the short-term volatility of these variables and the long-term nature of a pension plan, current practice views the interest rate assumption as long-term. Therefore, short-term periods should not overly influence this rate.

The valuation interest rate was reviewed through a forecast of the expected return of the System's assets over the next 30 years using the System's current target asset allocation, as shown below:

<b>Asset Class</b>	<b>Target Policy</b>	<b>Range</b>
Domestic Equities	39.25%	34.25% - 44.25%
International Equities (Developed Markets)	13.25%	8.25% - 18.25%
International Equities (Emerging Markets)	1.50%	0.00% - 3.00%
Fixed Income (including International)	29.00%	24.00% - 34.00%
Hedge Funds	13.00%	8.00% - 18.00%
Private Equity	4.00%	0.00% - 6.00%

Forecast values were generated using the GEMS Economic Scenario Generator, which Buck Consultants leases from Conning and Company. The GEMS model is a multifactor economic model that uses basic macroeconomic variables, such as GDP growth, employment levels, expected and actual inflation, to generate simulations of the economy over the time. A total of 1,000 stochastic forecast paths were generated, and the simulated geometric mean portfolio return based on the System's target asset allocation over 30 years was computed on each path.

The 1,000 forecasted returns produced by the GEMS model averaged 8.45% over the next 30 years, which compares favorably to the current assumed rate of 8.25%. The current asset allocation has an equity exposure of approximately 85%, considerably higher than the target range. At this level the future investment returns can be quite volatile year to year, possibly leading to returns well above or well under the 8.45% average projected rate of return, which can result in great swings in annual contribution requirements. Over the same 30-year period, the geometric average of forecasted inflation rates is 3.12%. The difference between the overall 8.45% rate of return and the 3.12% inflation rates is 5.33%, which is the forecasted real rate of return.

Only hindsight will tell whether a particular combination of economic assumptions is optimal. We believe the current 8.25% interest rate assumption can be supported based on our analysis assuming the target asset allocation continues, the assets earn the assumed rate of return and the City makes the recommended contributions. However, the Retirement System should consult with its investment advisors regarding the interest rate assumption and liquidity needs.

The annual cost-of-living adjustments (COLAs) for certain retirees are negotiated and set at a certain specific rate. As none of the COLAs are linked to inflation, no analyses were performed on the COLAs and they will continue to be valued at the current annual percent increases. We do, however, recommend a change for the "Special Award" retirees as denoted in our valuation reports. Due to the unclear nature of their actual COLAs when initially granted, all of these particular retirees were valued with a 5% COLA to be conservative. Now with a compilation of several years of data for these members, we have determined that the majority of them have received either no COLA or a 3% COLA for the past few years. As such, we recommend changing their assumed COLA from 5% to what they have actually been receiving.

### **Funding (Cost) Method:**

The current actuarial funding method is Entry Age Normal (EAN) method with the unfunded accrued liability (UAL) funded on a level percent of payroll basis over a closed period, currently 28 years. The funding method does not impact the Plan's liabilities, but rather is a method of determining the contribution requirements needed to support the liabilities. The EAN cost method provides a more stable annual contribution than other methods and it the method that is most widely used in public sector plans. We recommend no change in the funding method at this time. As mentioned above, the amortization of the unfunded liability is amortized as a level percent of payroll. The current methodology assumes a 5% growth in payroll each year and therefore results in the UAL amortization payments growing by 5% a year as well. We recommend lowering the 5% assumption to 3.5% in order to be consistent with the ultimate assumed growth in pay each year. Lowering to 3.5% will result in a higher amortization payment in the valuation year, but future payments thereafter will increase at a slower rate, i.e. by 3.5% rather than 5%, over the remaining closed amortization period.

**Asset Valuation Method:**

The assets are valued using an asset-smoothing methodology that recognizes 20% of any difference between actual and expected investment income (gain/loss) in the valuation year and 20% of unrecognized investment gains/losses for each of the four previous valuation years. Such smoothed actuarial asset value shall not be less than 80% or greater than 120% of the market value of assets. Asset smoothing, as compared to recognizing the market value, results in less volatility of actuarial asset values and contribution requirements. No changes in asset method are recommended at this time.

**Assessment of Overall Implications of Contribution Allocation Procedure:**

The System is only about 32% funded (ratio of valuation assets to accrued liabilities) as of June 30, 2011, so there is not much of a cushion to absorb significant future adverse experience. As with most mature retirement systems, contributions required each year are less than the benefits paid during the year, so the difference is made up from investment earnings. If there are years of negative investment experience and/or the level of contributions actually made is less than required (given the City's current financial constraints and the expected increase in contributions due to the assumption changes), the System would have to liquidate investments to make up the difference. If a larger portion of the assets were needed in order to meet benefit payments, then more of the System's assets would presumably be held in more liquid investment classes (e.g. cash or cash equivalents, bonds), which in turn may limit its ability to realize the returns at the currently assumed level. Again, we recommend the Retirement System consult with its investment advisors regarding the interest rate assumption and liquidity needs.

## Results and Conclusions for Class A

### *Rates of Service Retirement*

For members hired prior to July 1, 2004 the retirement eligibility is either age 55 or the attainment of either 25 or 30 years of service. For dates of hire thereafter, ten years of service are required in addition to attaining a certain age. Nobody hired on or after July 1, 2004 was eligible for retirement in the years in this study so our service retirement analysis was based on the pre-July 1, 2004 employee group. For those members hired on or after July 1, 1992, eligibility for retiree medical benefits has a ten year service requirement in addition to the attainment of age 55.

The current assumptions are unisex and are based on age, with the provision of immediate retirement at age 75. The total number of actual service retirements during the five-year period in the study was fairly close to those expected, but there were considerably more retirements than expected at the younger ages and fewer than expected at the older ages. We also reviewed the actual and expected occurrences separately for those members age 55 and older and those 55 and older with at least ten years of service. The data shows that retirement rates are higher for those with at least ten years of service, presumably due to being eligible for retiree medical benefits. As such, we recommend having one set of age-related retirement rates for those with less than ten years of service and another set for those with at least ten years of service. Additionally we recommend adjusting the rates at certain ages to better align with experience and maintain the 100% retirement assumption at age 75. The economic times experienced in recent years makes it difficult to accurately adjust retirement rates as some retirement eligible workers continue to work due to personal investment losses and financial insecurity (i.e. cannot afford to retire) while others retire earlier than they otherwise might have in order to secure their pension or retiree medical benefits (i.e. believing that any cutbacks would not affect individuals already retired). The next study may provide us with additional information about retirement trends.

### *Rates of Withdrawal*

The current assumptions of withdrawal are unisex and based on age. Over the five-year period reviewed in this study, the ratio of total actual withdrawals to those expected was over 200%, i.e. actual withdrawals were more than twice those expected, and was fairly consistent for each year in the study. As a result, we recommend increasing the rates of withdrawal to better match experience.

### *Rates of Mortality Among Active Members*

The total number of expected deaths was approximately 17 versus the 22 actual cases. The rates of mortality were changed for the 2011 valuation to be the same as those for post-retirement mortality (see post-retirement mortality section below). We recommend no further changes at this time.

### *Rates of Disability Retirement*

The actual number of disability retirements was considerably lower than expected, both in total and for each year in the study. We recommend reducing the rates of disability to better reflect

actual occurrences, but recommend maintaining the assumptions that 2/3 of future disabilities will be non-job related (ordinary) and 1/3 will be job-related (accidental).

#### *Rates of Salary Increase*

Salary is a factor in determining the majority of benefits provided by the System so it is critical to have an accurate assumption for future salary increases. The components of the salary increase assumption typically consist of wage inflation, productivity growth and merit/seniority. Given the collectively bargained nature of the Retirement System's active participants, we changed the salary increase assumptions for the 2011 valuation to reflect the most recently negotiated increases, namely no increases for the next two fiscal years followed by assumed increases of 3.50% thereafter. As a result, no further changes are recommended at this point and the assumptions will be reviewed either in the next experience study or possibly after the next round of contract negotiations.

#### *Rates of Mortality Among Retirees*

The number of actual deaths of service retirees and beneficiaries was fairly close to those expected. Due to recent updates within Actuarial Standard of Practice No. 35 (ASOP 35) of the Actuarial Standards Board (ASB), the male and female healthy retiree mortality tables used in the 2011 valuation were changed to the RP-2000 Combined Healthy Mortality Table with static projection to 2021 using Scale AA. We recommend continuing with this table until the next study.

There were 20 actual deaths for disability retirees compared to approximately 16 expected. Given the relative closeness of the results and the low number of deaths each year, we recommend no changes at this time.

The following tables and graphs summarize the results of the experience investigation. The tables illustrate the System's experience relative to current assumptions for the period being investigated. Numbers of actual separations as well as those expected are shown, along with various ratios, to help illustrate the basis for our recommendations. It should be noted that the tabular results are based on five-year grouping of ages.

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF PROVIDENCE  
CLASS A  
SEPARATION FROM ACTIVE SERVICE  
RATES OF WITHDRAWAL**

**Males and Females Combined**

**Experience by Age**

<b>Age</b>	<b>Exposed Number</b>	<b>Expected Number</b>	<b>Actual Number</b>	<b>Actual/Expected (Current)</b>	<b>Expected Rate</b>	<b>Actual Rate</b>	<b>Proposed Rate</b>	<b>Actual/Expected (Proposed)</b>
Under 30	583	59.21	61	103.0%	0.10156	0.10463	0.10500	99.6%
30-34	868	47.39	77	162.5	0.05460	0.08871	0.08000	110.9
35-39	1,287	56.38	92	163.2	0.04381	0.07148	0.05900	121.2
40-44	1,529	52.49	87	165.7	0.03433	0.05690	0.04500	126.4
45-49	1,706	39.63	111	280.1	0.02323	0.06506	0.03250	200.2
50-54	1,637	22.41	122	544.4	0.01369	0.07453	0.02000	372.6
55-59	183	1.21	17	1,405.0	0.00661	0.09290	0.00750	1238.6
60 and over	7	0.00	1	0.0	0.00000	0.14286	0.00000	0.0
<b>Total</b>	<b>7,800</b>	<b>278.72</b>	<b>568</b>	<b>203.8%</b>				<b>154.7%</b>

**Overall Experience by Year**

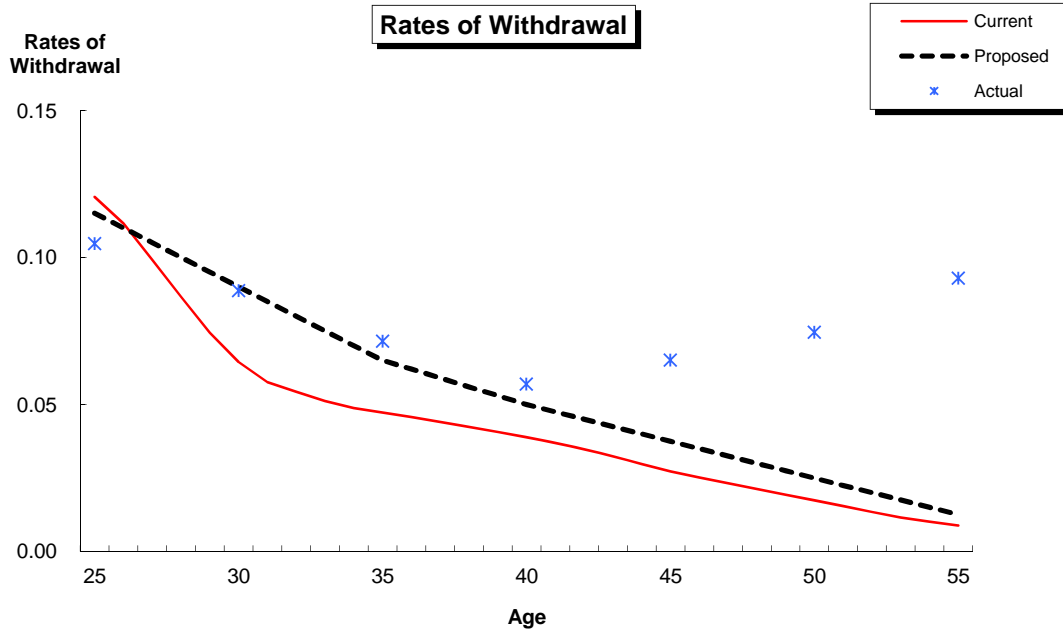
<b>Fiscal Year</b>	<b>Exposed Number</b>	<b>Expected Number</b>	<b>Actual Number</b>	<b>Actual/Expected (Current)</b>	<b>Actual/Expected (Proposed)</b>
2006-2007	1,603	59.29	123	207.5%	157.2%
2007-2008	1,624	59.71	122	204.3	155.6
2008-2009	1,544	55.01	101	183.6	139.0
2009-2010	1,491	52.07	92	176.7	134.3
2010-2011	1,538	52.64	130	247.0	186.5
<b>Total</b>	<b>7,800</b>	<b>278.72</b>	<b>568</b>	<b>203.8%</b>	<b>154.7%</b>

Recommendation: Adjust rates to better reflect experience.



**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF PROVIDENCE  
CLASS A**

**7/1/2006 - 6/30/2011 Experience Study**



**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF PROVIDENCE**  
**CLASS A**  
**SEPARATION FROM ACTIVE SERVICE**  
**RATES OF DEATH**

**Males and Females Combined**

**Experience by Age**

<b>Age</b>	<b>Exposed Number</b>	<b>Expected Number</b>	<b>Actual Number</b>	<b>Actual/Expected</b>	<b>Expected Rate</b>	<b>Actual Rate</b>
Under 30	583	0.10	3	3000.0%	0.00017	0.00515
30-34	868	0.28	2	714.3	0.00032	0.00230
35-39	1,287	0.64	1	156.3	0.00050	0.00078
40-44	1,530	1.14	4	350.9	0.00075	0.00261
45-49	1,764	1.97	2	101.5	0.00112	0.00113
50-54	1,924	3.33	3	90.1	0.00173	0.00156
55-59	1,435	4.03	2	49.6	0.00281	0.00139
60 and over	1,192	5.22	5	95.8	0.00438	0.00419
<b>Total</b>	<b>10,583</b>	<b>16.71</b>	<b>22</b>	<b>131.7%</b>		

**Overall Experience by Year**

<b>Fiscal Year</b>	<b>Exposed Number</b>	<b>Expected Number</b>	<b>Actual Number</b>	<b>Actual/Expected</b>
2006-2007	2,150	3.22	4	124.2%
2007-2008	2,175	3.31	3	90.6
2008-2009	2,092	3.28	8	243.9
2009-2010	2,064	3.39	4	118.0
2010-2011	2,102	3.51	3	85.5
<b>Total</b>	<b>10,583</b>	<b>16.71</b>	<b>22</b>	<b>131.7%</b>

Results shown above were based on the mortality table used prior to the 2011 valuation. Mortality was changed for the 2011 valuation and it is recommended that those rates be continued.

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF PROVIDENCE**  
**CLASS A**  
**SEPARATION FROM ACTIVE SERVICE**  
**RATES OF DISABILITY**

**Males and Females Combined**

**Experience by Age**

<b>Age</b>	<b>Exposed Number</b>	<b>Expected Number</b>	<b>Actual Number</b>	<b>Actual/Expected (Current)</b>	<b>Expected Rate</b>	<b>Actual Rate</b>	<b>Proposed Rate</b>	<b>Actual/Expected (Proposed)</b>
Under 30	583	0.26	0	0.0%	0.00045	0.00000	0.00035	0.0%
30-34	868	0.53	0	0.0	0.00061	0.00000	0.00055	0.0
35-39	1,287	1.18	1	84.7	0.00092	0.00078	0.00080	97.1
40-44	1,530	2.21	2	90.5	0.00144	0.00131	0.00130	100.6
45-49	1,764	3.92	2	51.0	0.00222	0.00113	0.00200	56.7
50-54	1,924	6.08	0	0.0	0.00316	0.00000	0.00240	0.0
55-59	1,435	6.51	3	46.1	0.00454	0.00209	0.00300	69.7
60 and over	1,192	9.67	2	20.7	0.00811	0.00168	0.00450	37.3
<b>Total</b>	<b>10,583</b>	<b>30.36</b>	<b>10</b>	<b>32.9%</b>				<b>52.8%</b>

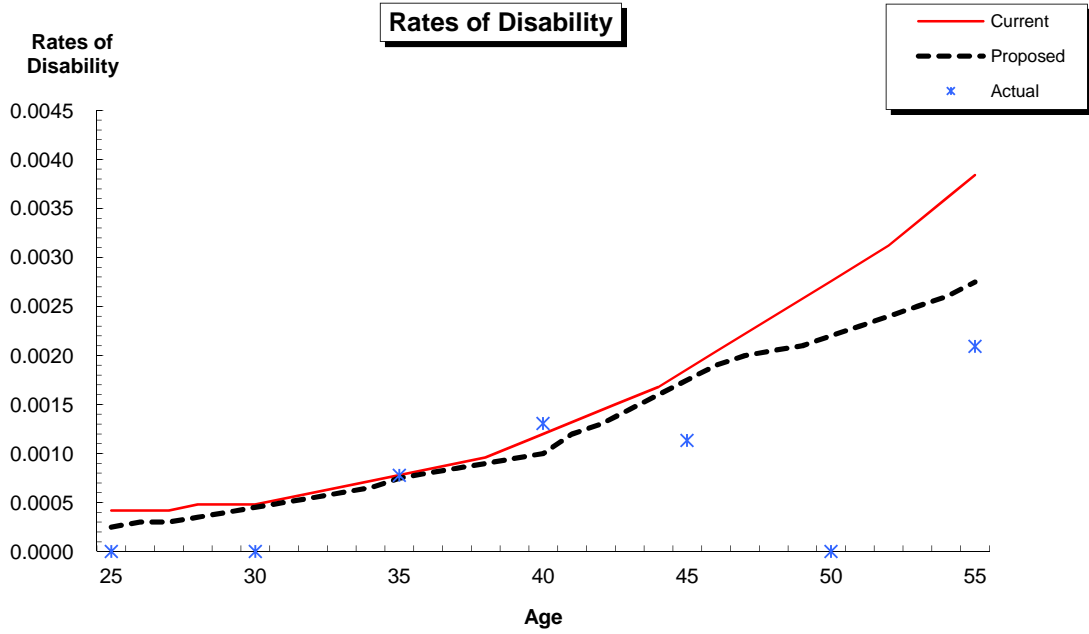
**Overall Experience by Year**

<b>Fiscal Year</b>	<b>Exposed Number</b>	<b>Expected Number</b>	<b>Actual Number</b>	<b>Actual/Expected (Current)</b>	<b>Actual/Expected (Proposed)</b>
2006-2007	2,150	5.84	3	51.4%	79.6%
2007-2008	2,175	5.99	3	50.1	77.5
2008-2009	2,092	5.96	2	33.6	52.8
2009-2010	2,064	6.18	2	32.4	52.7
2010-2011	2,102	6.39	0	0.0	0.0
<b>Total</b>	<b>10,583</b>	<b>30.36</b>	<b>10</b>	<b>32.9%</b>	<b>52.8%</b>

Recommendation: Adjust rates to better reflect experience.

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF PROVIDENCE  
CLASS A**

**7/1/2006 - 6/30/2011 Experience Study**



**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF PROVIDENCE  
CLASS A  
SEPARATION FROM ACTIVE SERVICE  
RATES OF SERVICE RETIREMENT FOR EMPLOYEES WITH LESS THAN 10 YEARS OF SERVICE**

**Males and Females Combined**

**Experience by Age**

<b>Age</b>	<b>Exposed Number</b>	<b>Expected Number</b>	<b>Actual Number</b>	<b>Actual/Expected (Current)</b>	<b>Expected Rate</b>	<b>Actual Rate</b>	<b>Proposed Rate</b>	<b>Actual/Expected (Proposed)</b>
Under 50	0	0.00	0	0.0%	0.00000	0.00000	0.04000	0.0%
50-54	0	0.00	0	0.0	0.00000	0.00000	0.05500	0.0
55-59	297	29.12	23	79.0	0.09805	0.07744	0.07000	110.6
60-64	250	29.68	25	84.2	0.11872	0.10000	0.12000	83.3
65-69	92	19.50	15	76.9	0.21196	0.16304	0.15000	108.7
70 and over	63	26.00	7	26.9	0.41270	0.11111	0.30000	37.0
<b>Total</b>	<b>702</b>	<b>104.33</b>	<b>70</b>	<b>67.1%</b>				<b>84.7%</b>

**Overall Experience by Year**

<b>Fiscal Year</b>	<b>Exposed Number</b>	<b>Expected Number</b>	<b>Actual Number</b>	<b>Actual/Expected (Current)</b>	<b>Actual/Expected (Proposed)</b>
2006-2007	154	24.14	14	58.0%	82.0%
2007-2008	161	25.64	15	58.5	84.2
2008-2009	144	23.16	14	60.4	83.6
2009-2010	134	16.55	18	108.8	108.2
2010-2011	109	14.84	9	60.6	61.9
<b>Total</b>	<b>702</b>	<b>104.33</b>	<b>70</b>	<b>67.1%</b>	<b>84.7%</b>

Recommendation: Adjust rates to better reflect experience.

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF PROVIDENCE  
CLASS A  
SEPARATION FROM ACTIVE SERVICE  
RATES OF SERVICE RETIREMENT FOR EMPLOYEES WITH 10 OR MORE YEARS OF SERVICE**

**Males and Females Combined**

**Experience by Age**

<b>Age</b>	<b>Exposed Number</b>	<b>Expected Number</b>	<b>Actual Number</b>	<b>Actual/Expected (Current)</b>	<b>Expected Rate</b>	<b>Actual Rate</b>	<b>Proposed Rate</b>	<b>Actual/Expected (Proposed)</b>
Under 50	59	4.81	6	124.7%	0.08153	0.10169	0.08500	119.6%
50-54	287	22.45	31	138.1	0.07822	0.10801	0.10500	102.9
55-59	955	93.00	129	138.7	0.09738	0.13508	0.12000	112.6
60-64	483	68.92	75	108.8	0.14269	0.15528	0.13500	115.0
65-69	200	50.00	43	86.0	0.25000	0.21500	0.20000	107.5
70 and over	97	49.00	16	32.7	0.50515	0.16495	0.30000	55.0
<b>Total</b>	<b>2,081</b>	<b>288.18</b>	<b>300</b>	<b>104.1%</b>				<b>103.7%</b>

**Overall Experience by Year**

<b>Fiscal Year</b>	<b>Exposed Number</b>	<b>Expected Number</b>	<b>Actual Number</b>	<b>Actual/Expected (Current)</b>	<b>Actual/Expected (Proposed)</b>
2006-2007	393	53.43	59	110.4%	111.5%
2007-2008	390	51.76	50	96.6	94.1
2008-2009	404	56.89	38	66.8	67.5
2009-2010	439	61.90	56	90.5	90.6
2010-2011	455	64.21	97	151.1	149.7
<b>Total</b>	<b>2,081</b>	<b>288.19</b>	<b>300</b>	<b>104.1%</b>	<b>103.7%</b>

Recommendation: Adjust rates to better reflect experience.

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF PROVIDENCE  
CLASS A**

**RATES OF SALARY INCREASE**

**Males and Females Combined**

**Experience by Age**

<b>Age</b>	<b>Number</b>	<b>Actual Last Year</b>	<b>Expected Last Year</b>	<b>Actual This Year</b>	<b>Actual/Expected</b>
Under 30	646	20,026,955	20,883,395	20,884,728	100.0%
30-34	873	28,758,371	29,982,421	29,977,009	100.0
35-39	1,241	43,754,382	45,615,530	45,052,406	98.8
40-44	1,502	55,740,201	58,110,979	57,257,032	98.5
45-49	1,667	61,809,735	64,440,459	63,418,991	98.4
50-54	1,729	65,927,539	68,728,823	67,342,349	98.0
55-59	1,117	45,909,144	47,853,547	47,037,811	98.3
60 and over	838	32,691,747	34,075,780	33,370,343	97.9
<b>Total</b>	<b>9,613</b>	<b>354,618,074</b>	<b>369,690,934</b>	<b>364,340,669</b>	<b>98.6%</b>

**Overall Experience by Year**

<b>Fiscal Year</b>	<b>Number</b>	<b>Actual Last Year</b>	<b>Expected Last Year</b>	<b>Actual This Year</b>	<b>Actual/Expected</b>
2006-2007	1,947	71,901,658	75,137,232	71,855,416	95.6%
2007-2008	1,982	70,760,248	73,944,460	73,107,785	98.9
2008-2009	1,929	70,567,451	73,390,150	73,571,320	100.2
2009-2010	1,892	71,458,830	74,317,184	73,248,483	98.6
2010-2011	1,863	69,929,887	72,901,908	72,557,665	99.5
<b>Total</b>	<b>9,613</b>	<b>354,618,074</b>	<b>369,690,934</b>	<b>364,340,669</b>	<b>98.6%</b>

It is recommended that the current rates be continued.

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF PROVIDENCE  
CLASS A  
RATES OF POST-RETIREMENT MORTALITY  
FOR HEALTHY RETIREES**

**Males and Females Combined**

**Experience by Age**

<b>Age</b>	<b>Exposed Number</b>	<b>Expected Number</b>	<b>Actual Number</b>	<b>Actual/Expected</b>	<b>Expected Rate</b>	<b>Actual Rate</b>
Under 50	34	0.00	1	0.0%	0.00000	0.02941
50-54	188	0.83	2	241.0	0.00441	0.01064
55-59	665	3.83	7	182.8	0.00576	0.01053
60-64	929	8.42	7	83.1	0.00906	0.00753
65-69	987	14.12	19	134.6	0.01431	0.01925
70-74	1,069	25.61	22	85.9	0.02396	0.02058
75-79	1,153	46.48	46	99.0	0.04031	0.03990
80-84	830	56.75	61	107.5	0.06837	0.07349
85-89	511	56.99	44	77.2	0.11153	0.08611
90-94	237	41.11	38	92.4	0.17346	0.16034
95 and over	53	12.57	16	127.3	0.23717	0.30189
<b>Total</b>	<b>6,656</b>	<b>266.71</b>	<b>263</b>	<b>98.6%</b>		

**Overall Experience by Year**

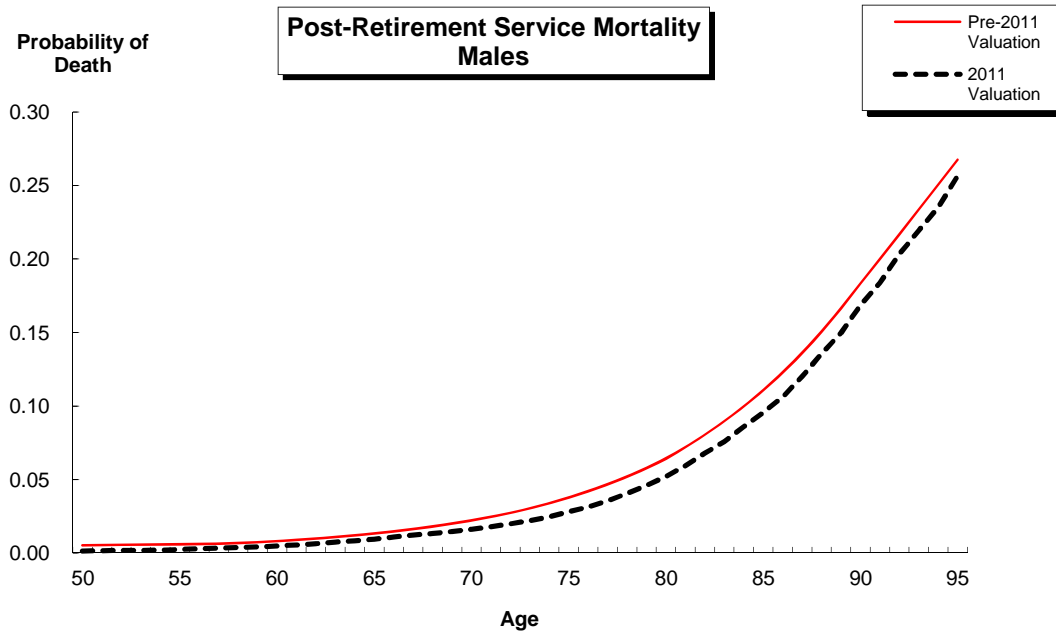
<b>Fiscal Year</b>	<b>Exposed Number</b>	<b>Expected Number</b>	<b>Actual Number</b>	<b>Actual/Expected</b>
2006-2007	1,313	51.14	51	99.7%
2007-2008	1,340	52.12	63	120.9
2008-2009	1,329	52.58	50	95.1
2009-2010	1,325	54.27	43	79.2
2010-2011	1,349	56.60	56	98.9
<b>Total</b>	<b>6,656</b>	<b>266.71</b>	<b>263</b>	<b>98.6%</b>

Results shown above were based on the mortality table used prior to the 2011 valuation. Mortality was changed for the 2011 valuation and it is recommended that those rates be continued.

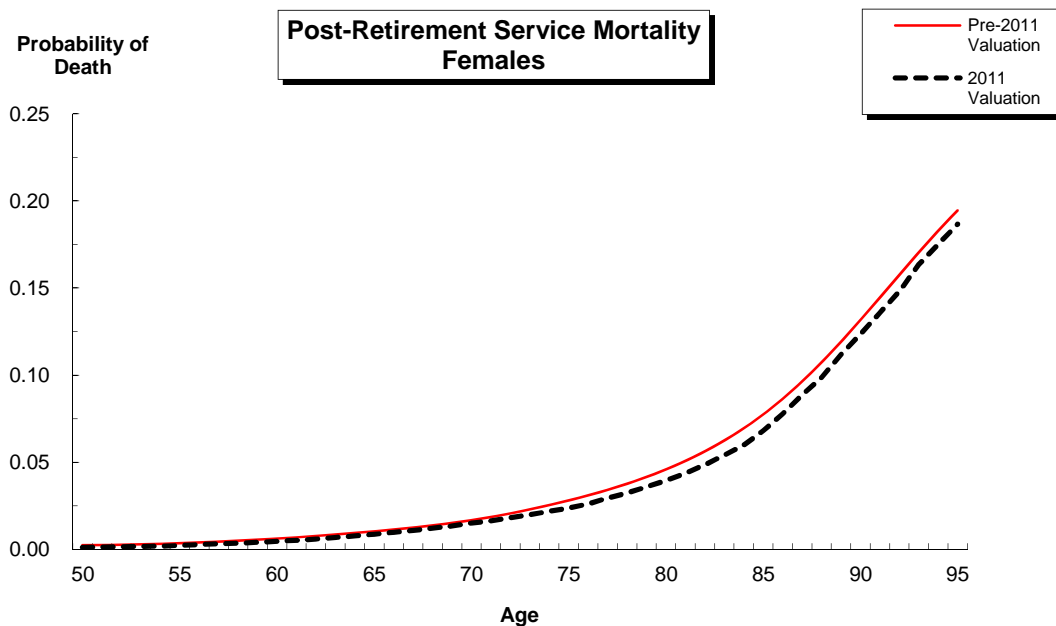


**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF PROVIDENCE  
CLASS A**

**7/1/2006 - 6/30/2011 Experience Study**



No changes from the 2011 valuation are recommended.



**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF PROVIDENCE  
CLASS A  
RATES OF POST-RETIREMENT MORTALITY  
FOR DISABILITY RETIREES**

**Males and Females Combined**

**Experience by Age**

<b>Age</b>	<b>Exposed Number</b>	<b>Expected Number</b>	<b>Actual Number</b>	<b>Actual/Expected</b>	<b>Expected Rate</b>	<b>Actual Rate</b>
Under 50	55	0.10	3	3000.0%	0.00182	0.05455
50-54	40	0.23	0	0.0	0.00575	0.00000
55-59	68	0.55	4	727.3	0.00809	0.05882
60-64	59	0.75	0	0.0	0.01271	0.00000
65-69	94	1.95	0	0.0	0.02074	0.00000
70-74	74	2.46	3	122.0	0.03324	0.04054
75-79	44	2.50	3	120.0	0.05682	0.06818
80-84	28	2.75	6	218.2	0.09821	0.21429
85-89	14	2.11	0	0.0	0.15071	0.00000
90-94	4	0.78	1	128.2	0.19500	0.25000
95 and over	5	2.00	0	0.0	0.40000	0.00000
<b>Total</b>	<b>485</b>	<b>16.18</b>	<b>20</b>	<b>123.6%</b>		

**Overall Experience by Year**

<b>Fiscal Year</b>	<b>Exposed Number</b>	<b>Expected Number</b>	<b>Actual Number</b>	<b>Actual/Expected</b>
2006-2007	102	3.33	4	120.1%
2007-2008	101	3.30	2	60.6
2008-2009	102	3.38	6	177.5
2009-2010	90	2.96	2	67.6
2010-2011	90	3.21	6	186.9
<b>Total</b>	<b>485</b>	<b>16.18</b>	<b>20</b>	<b>123.6%</b>

It is recommended that the current rates be continued.

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF PROVIDENCE  
CLASS A  
RATES OF POST-RETIREMENT MORTALITY  
FOR BENEFICIARIES OF RETIREES**

**Males and Females Combined**

**Experience by Age**

<b>Age</b>	<b>Exposed Number</b>	<b>Expected Number</b>	<b>Actual Number</b>	<b>Actual/Expected</b>	<b>Expected Rate</b>	<b>Actual Rate</b>
Under 50	12	0.00	0	0.0%	0.00000	0.00000
50-54	21	0.06	0	0.0	0.00286	0.00000
55-59	50	0.21	1	476.2	0.00420	0.02000
60-64	50	0.44	2	454.5	0.00880	0.04000
65-69	80	1.05	1	95.2	0.01313	0.01250
70-74	139	3.00	4	133.3	0.02158	0.02878
75-79	143	5.09	5	98.2	0.03559	0.03497
80-84	215	12.69	5	39.4	0.05902	0.02326
85-89	170	17.01	15	88.2	0.10006	0.08824
90-94	127	19.81	14	70.7	0.15598	0.11024
95 and over	44	10.05	6	59.7	0.22841	0.13636
<b>Total</b>	<b>1,051</b>	<b>69.41</b>	<b>53</b>	<b>76.4%</b>		

**Overall Experience by Year**

<b>Fiscal Year</b>	<b>Exposed Number</b>	<b>Expected Number</b>	<b>Actual Number</b>	<b>Actual/Expected</b>
2006-2007	203	12.30	8	65.0%
2007-2008	211	13.43	9	67.0
2008-2009	216	14.03	16	114.0
2009-2010	210	14.55	9	61.9
2010-2011	211	15.10	11	72.8
<b>Total</b>	<b>1,051</b>	<b>69.41</b>	<b>53</b>	<b>76.4%</b>

Results shown above were based on the mortality table used prior to the 2011 valuation. Mortality was changed for the 2011 valuation and it is recommended that those rates be continued.

## **Results and Conclusions for Class B**

### *Rates of Service Retirement*

The current assumptions are unisex and are based on age, with the provision of immediate retirement at age 65. As discussed in the Class A service retirement section, retiree medical eligibility has a ten year service requirement in addition to attaining age 55. Given the low number of Class B members hired after age 45, the ten year service requirement for retiree medical eligibility did not impact the retirements for Class B members as they did for Class A.

The total number of actual service retirements during the five-year period in the study was approximately 103% of those expected, but there were considerably fewer retirements than expected at the younger ages and more than expected at the older ages. As such, we recommend decreasing the rates through age 54 and increasing them thereafter, but maintaining the 100% retirement assumption at age 65. The economic times experienced in recent years makes it difficult to accurately adjust retirement rates as some retirement eligible workers continue to work due to personal investment losses and financial insecurity (i.e. cannot afford to retire) while others retire earlier than they otherwise might have in order to secure their pension or retiree medical benefits (i.e. believing that any cutbacks would not affect individuals already retired). The next study may provide us with additional information about retirement trends.

### *Rates of Withdrawal*

The current assumptions of withdrawal are unisex and based on age. Over the five-year period reviewed in this study, the ratio of total actual withdrawals to those expected was over 300%, i.e. actual withdrawals were more than triple those expected, and was fairly consistent for each year in the study. As a result, we recommend increasing the rates of withdrawal to better match experience.

### *Rates of Mortality Among Active Members*

The total number of expected deaths was approximately 11 versus the 3 actual cases. The rates of mortality were changed for the 2011 valuation to be the same as those for post-retirement mortality (see post-retirement mortality section below). We recommend no further changes at this time.

### *Rates of Disability Retirement*

The actual number of disability retirements was fairly close to those expected, both in total and for each year in the study. As such, we recommend no change in the rates and also recommend maintaining the assumptions that 10% of future disabilities will be non-job related (ordinary) and 90% will be job-related (accidental).

### *Service Purchases*

Currently loads are added to service amounts for Class B active members to account for purchased service prior to retirement. The valuation loads are 0.63 years for Fire and 2.11 years for Police. We reviewed the last few years of valuation data and based on our findings we recommend a decrease in the loads to 0.50 years for Fire and to 1.00 year for Police.

### *Rates of Salary Increase*

Salary is a factor in determining the majority of benefits provided by the System so it is critical to have an accurate assumption for future salary increases. The components of the salary increase assumption typically consist of wage inflation, productivity growth and merit/seniority. Given the collectively bargained nature of the Retirement System's active participants, we changed the salary increase assumptions for the 2011 valuation to reflect the most recently negotiated increases, namely no increases for the next two fiscal years followed by assumed increases of 3.50% thereafter. As a result, no further changes are recommended at this point and the assumptions will be reviewed either in the next experience study or possibly after the next round of contract negotiations.

### *Rates of Mortality Among Retirees*

The number of actual deaths of service retirees and beneficiaries was fairly close to those expected. Due to recent updates within Actuarial Standard of Practice No. 35 (ASOP 35) of the Actuarial Standards Board (ASB), the male and female healthy retiree mortality tables used in the 2011 valuation were changed to the RP-2000 Combined Healthy Mortality Table with static projection to 2021 using Scale AA. We recommend adding a blue collar adjustment to reflect the fact that the retirees are firemen and policemen who, on average, experience higher rates of mortality than non-uniformed members.

There were 55 actual deaths for disability retirees compared to approximately 59 expected. Given the relative closeness of the results, we recommend no changes at this time.

The following tables and graphs summarize the results of the experience investigation. The tables illustrate the System's experience relative to current assumptions for the period being investigated. Numbers of actual separations as well as those expected are shown, along with various ratios, to help illustrate the basis for our recommendations. It should be noted that the tabular results are based on five-year grouping of ages.

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF PROVIDENCE  
CLASS B  
SEPARATION FROM ACTIVE SERVICE  
RATES OF WITHDRAWAL**

**Males and Females Combined**

**Experience by Age**

<b>Age</b>	<b>Exposed Number</b>	<b>Expected Number</b>	<b>Actual Number</b>	<b>Actual/Expected (Current)</b>	<b>Expected Rate</b>	<b>Actual Rate</b>	<b>Proposed Rate</b>	<b>Actual/Expected (Proposed)</b>
Under 30	399	6.27	9	143.5%	0.01571	0.02256	0.01700	132.7%
30-34	428	3.20	8	250.0	0.00748	0.01869	0.01200	155.8
35-39	793	2.74	15	547.4	0.00346	0.01892	0.00700	270.2
40-44	885	2.32	17	732.8	0.00262	0.01921	0.00470	408.7
45-49	472	0.75	4	533.3	0.00159	0.00847	0.00270	313.9
50-54	138	0.00	1	0.0	0.00000	0.00725	0.00090	0.0
55 and over	0	0.00	0	0.0	0.00000	0.00000	0.00000	0.0
<b>Total</b>	<b>3,115</b>	<b>15.28</b>	<b>54</b>	<b>353.4%</b>				<b>232.6%</b>

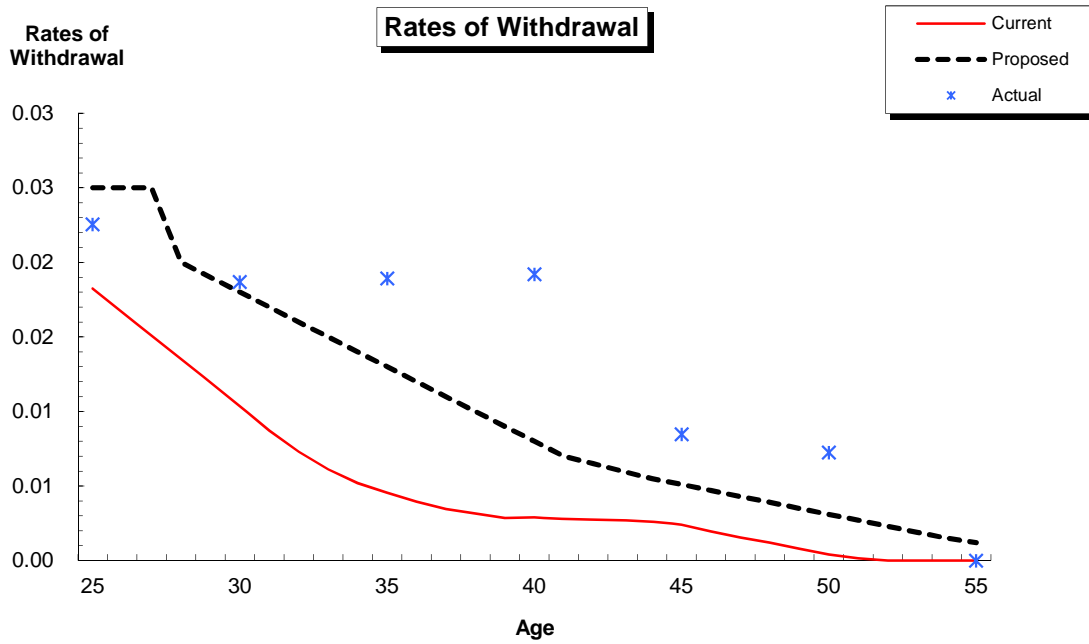
**Overall Experience by Year**

<b>Fiscal Year</b>	<b>Exposed Number</b>	<b>Expected Number</b>	<b>Actual Number</b>	<b>Actual/Expected (Current)</b>	<b>Actual/Expected (Proposed)</b>
2006-2007	710	3.02	15	496.7%	315.4%
2007-2008	674	3.28	22	670.7	434.3
2008-2009	589	3.22	5	155.3	102.2
2009-2010	567	2.87	9	313.6	197.5
2010-2011	575	2.89	3	103.8	62.0
<b>Total</b>	<b>3,115</b>	<b>15.28</b>	<b>54</b>	<b>353.4%</b>	<b>232.6%</b>

Recommendation: Adjust rates to better reflect experience.

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF PROVIDENCE  
CLASS B**

**7/1/2006 - 6/30/2011 Experience Study**



**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF PROVIDENCE  
CLASS B  
SEPARATION FROM ACTIVE SERVICE  
RATES OF DEATH**

**Males and Females Combined**

**Experience by Age**

<b>Age</b>	<b>Exposed Number</b>	<b>Expected Number</b>	<b>Actual Number</b>	<b>Actual/Expected</b>	<b>Expected Rate</b>	<b>Actual Rate</b>
Under 30	399	0.28	0	0.0%	0.00070	0.00000
30-34	428	0.48	0	0.0	0.00112	0.00000
35-39	795	1.39	0	0.0	0.00175	0.00000
40-44	1,134	2.52	0	0.0	0.00222	0.00000
45-49	1,032	3.06	1	32.7	0.00297	0.00097
50-54	604	2.40	1	41.7	0.00397	0.00166
55-59	182	1.07	0	0.0	0.00588	0.00000
60 and over	9	0.08	1	1,250.0	0.00889	0.11111
<b>Total</b>	<b>4,583</b>	<b>11.28</b>	<b>3</b>	<b>26.6%</b>		

**Overall Experience by Year**

<b>Fiscal Year</b>	<b>Exposed Number</b>	<b>Expected Number</b>	<b>Actual Number</b>	<b>Actual/Expected</b>
2006-2007	921	2.18	0	0.0%
2007-2008	930	2.24	0	0.0
2008-2009	930	2.25	2	88.9
2009-2010	903	2.28	0	0.0
2010-2011	899	2.33	1	42.9
<b>Total</b>	<b>4,583</b>	<b>11.28</b>	<b>3</b>	<b>26.6%</b>

Results shown above were based on the mortality table used prior to the 2011 valuation. Mortality was changed for the 2011 valuation and it is recommended that those rates be continued.



**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF PROVIDENCE  
CLASS B  
SEPARATION FROM ACTIVE SERVICE  
RATES OF DISABILITY**

**Males and Females Combined**

**Experience by Age**

<b>Age</b>	<b>Exposed Number</b>	<b>Expected Number</b>	<b>Actual Number</b>	<b>Actual/Expected</b>	<b>Expected Rate</b>	<b>Actual Rate</b>
Under 30	399	0.55	1	181.8%	0.00138	0.00251
30-34	428	0.91	1	109.9	0.00213	0.00234
35-39	795	2.40	5	208.3	0.00302	0.00629
40-44	1,134	5.35	7	130.8	0.00472	0.00617
45-49	1,032	8.70	2	23.0	0.00843	0.00194
50-54	604	7.90	7	88.6	0.01308	0.01159
55-59	182	3.32	2	60.2	0.01824	0.01099
60 and over	9	0.19	0	0.0	0.02111	0.00000
<b>Total</b>	<b>4,583</b>	<b>29.32</b>	<b>25</b>	<b>85.3%</b>		

**Overall Experience by Year**

<b>Fiscal Year</b>	<b>Exposed Number</b>	<b>Expected Number</b>	<b>Actual Number</b>	<b>Actual/Expected</b>
2006-2007	921	5.46	7	128.2%
2007-2008	930	5.70	4	70.2
2008-2009	930	5.87	7	119.3
2009-2010	903	5.99	3	50.1
2010-2011	899	6.30	4	63.5
<b>Total</b>	<b>4,583</b>	<b>29.32</b>	<b>25</b>	<b>85.3%</b>

It is recommended that the current rates be continued.

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF PROVIDENCE  
CLASS B  
SEPARATION FROM ACTIVE SERVICE  
RATES OF SERVICE RETIREMENT**

**Males and Females Combined**

**Experience by Age**

<b>Age</b>	<b>Exposed Number</b>	<b>Expected Number</b>	<b>Actual Number</b>	<b>Actual/Expected (Current)</b>	<b>Expected Rate</b>	<b>Actual Rate</b>	<b>Proposed Rate</b>	<b>Actual/Expected (Proposed)</b>
Under 45	251	18.71	22	117.6%	0.07454	0.08765	0.05500	159.4%
45-49	560	43.37	27	62.3	0.07745	0.04821	0.06250	77.1
50-54	466	38.39	31	80.8	0.08238	0.06652	0.07500	88.7
55-59	182	16.94	35	206.6	0.09308	0.19231	0.10000	192.3
60-64	9	2.25	8	355.6	0.25000	0.88889	0.50000	177.8
65 and over	0	0.00	0	0.0	0.00000	0.00000	1.00000	0.0
<b>Total</b>	<b>1,468</b>	<b>119.66</b>	<b>123</b>	<b>102.8%</b>				<b>107.4%</b>

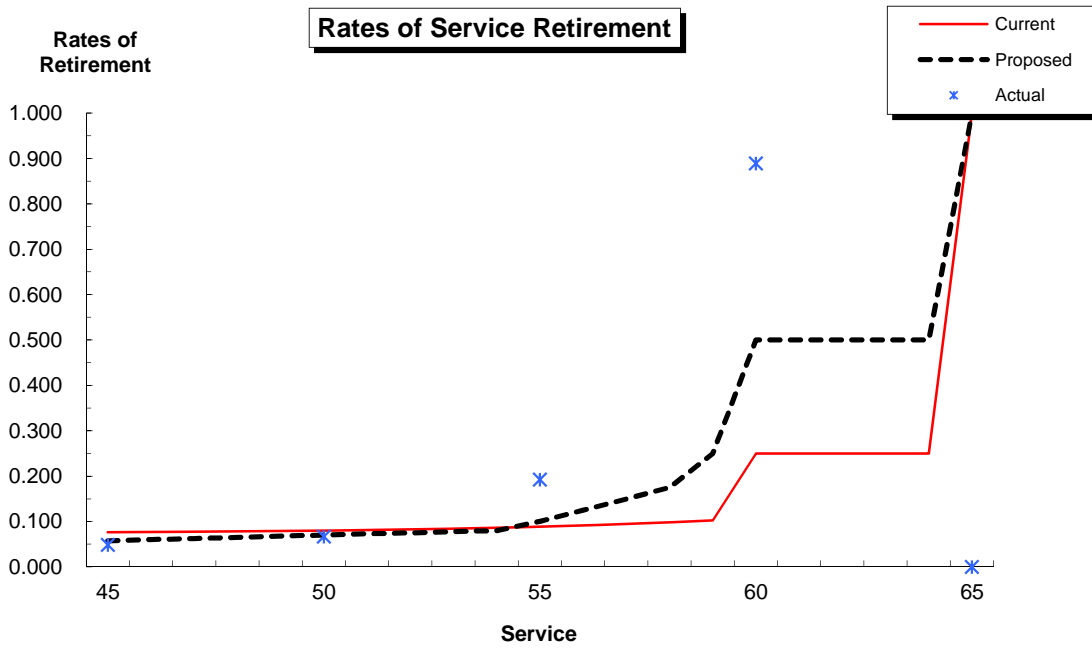
**Overall Experience by Year**

<b>Fiscal Year</b>	<b>Exposed Number</b>	<b>Expected Number</b>	<b>Actual Number</b>	<b>Actual/Expected (Current)</b>	<b>Actual/Expected (Proposed)</b>
2006-2007	211	17.02	22	129.3%	136.6%
2007-2008	256	20.87	28	134.2	138.6
2008-2009	341	27.84	20	71.8	73.7
2009-2010	336	27.44	18	65.6	70.7
2010-2011	324	26.49	35	132.1	137.5
<b>Total</b>	<b>1,468</b>	<b>119.66</b>	<b>123</b>	<b>102.8%</b>	<b>107.4%</b>

Recommendation: Adjust rates to better reflect experience.

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF PROVIDENCE  
CLASS B**

**7/1/2006 - 6/30/2011 Experience Study**



**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF PROVIDENCE  
CLASS B**

**RATES OF SALARY INCREASE**

**Males and Females Combined**

**Experience by Age**

<b>Age</b>	<b>Number</b>	<b>Actual Last Year</b>	<b>Expected Last Year</b>	<b>Actual This Year</b>	<b>Actual/Expected</b>
Under 30	468	22,219,368	23,158,449	23,358,647	100.9%
30-34	439	22,387,327	23,339,046	23,013,226	98.6
35-39	888	46,303,504	48,280,933	47,560,914	98.5
40-44	1,096	58,637,958	61,131,983	60,013,066	98.2
45-49	934	51,535,211	53,719,270	52,772,041	98.2
50-54	457	27,538,785	28,698,021	28,433,316	99.1
55 and over	96	5,733,532	5,977,472	5,853,939	97.9
<b>Total</b>	<b>4,378</b>	<b>234,355,685</b>	<b>244,305,174</b>	<b>241,005,149</b>	<b>98.6%</b>

**Overall Experience by Year**

<b>Fiscal Year</b>	<b>Number</b>	<b>Actual Last Year</b>	<b>Expected Last Year</b>	<b>Actual This Year</b>	<b>Actual/Expected</b>
2006-2007	877	45,849,017	47,912,224	45,753,010	95.5%
2007-2008	876	45,191,327	47,224,937	47,071,256	99.7
2008-2009	896	47,188,781	49,076,335	49,630,073	101.1
2009-2010	873	48,103,787	50,027,938	49,248,483	98.4
2010-2011	856	48,022,773	50,063,740	49,302,327	98.5
<b>Total</b>	<b>4,378</b>	<b>234,355,685</b>	<b>244,305,174</b>	<b>241,005,149</b>	<b>98.6%</b>

It is recommended that the current rates be continued.

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF PROVIDENCE  
CLASS B  
RATES OF POST-RETIREMENT MORTALITY  
FOR HEALTHY RETIREES**

**Males and Females Combined**

**Experience by Age**

<b>Age</b>	<b>Exposed Number</b>	<b>Expected Number</b>	<b>Actual Number</b>	<b>Actual/Expected</b>	<b>Expected Rate</b>	<b>Actual Rate</b>
Under 50	195	0.00	1	0.0%	0.00000	0.00513
50-54	297	1.63	1	61.3	0.00549	0.00337
55-59	465	3.06	1	32.7	0.00658	0.00215
60-64	554	5.43	2	36.8	0.00980	0.00361
65-69	272	4.38	5	114.2	0.01610	0.01838
70-74	279	7.70	9	116.9	0.02760	0.03226
75-79	310	14.85	13	87.5	0.04790	0.04194
80-84	256	20.33	26	127.9	0.07941	0.10156
85-89	134	17.18	17	99.0	0.12821	0.12687
90-94	14	2.82	3	106.4	0.20143	0.21429
95 and over	3	0.95	2	210.5	0.31667	0.66667
<b>Total</b>	<b>2,779</b>	<b>78.33</b>	<b>80</b>	<b>102.1%</b>		

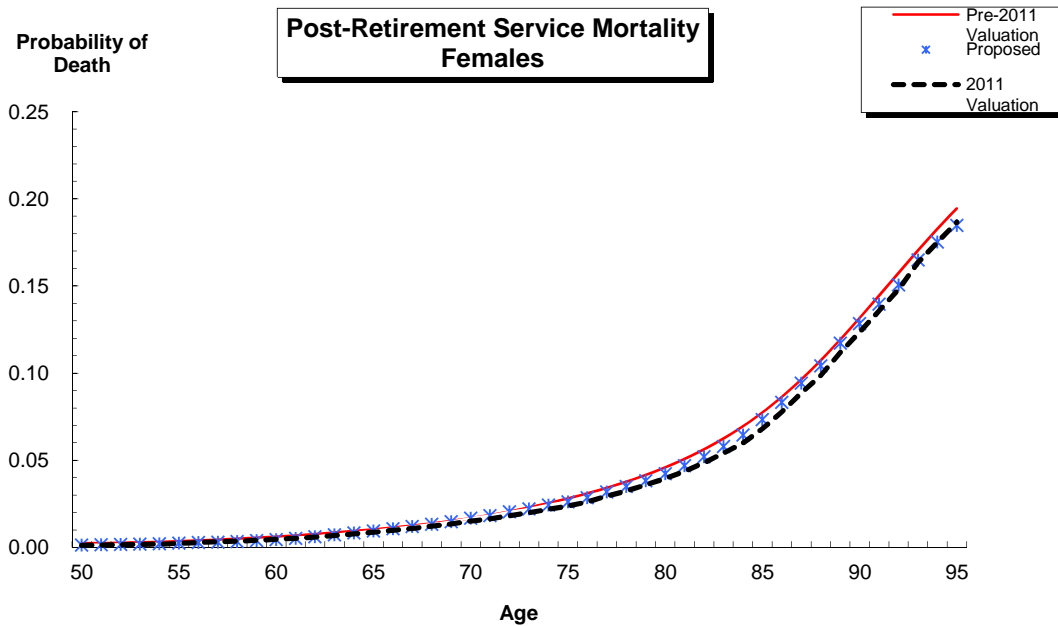
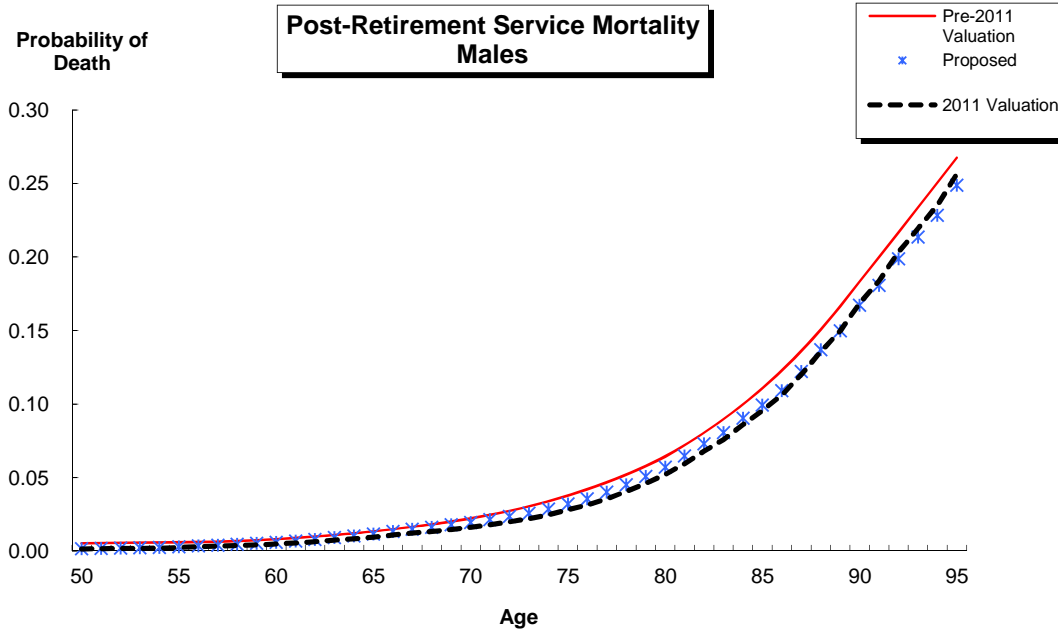
**Overall Experience by Year**

<b>Fiscal Year</b>	<b>Exposed Number</b>	<b>Expected Number</b>	<b>Actual Number</b>	<b>Actual/Expected</b>
2006-2007	533	14.98	18	120.2%
2007-2008	542	15.06	15	99.6
2008-2009	561	15.80	21	132.9
2009-2010	567	15.73	8	50.9
2010-2011	576	16.76	18	107.4
<b>Total</b>	<b>2,779</b>	<b>78.33</b>	<b>80</b>	<b>102.1%</b>

Results shown above were based on the mortality table used prior to the 2011 valuation. Mortality was changed for the 2011 valuation and it is recommended to switch to a mortality table with a "blue collar" adjustment that may be more appropriate for Class B members.

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF PROVIDENCE  
CLASS B**

**7/1/2006 - 6/30/2011 Experience Study**



**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF PROVIDENCE  
CLASS B  
RATES OF POST-RETIREMENT MORTALITY  
FOR DISABILITY RETIREES**

**Males and Females Combined**

**Experience by Age**

<b>Age</b>	<b>Exposed Number</b>	<b>Expected Number</b>	<b>Actual Number</b>	<b>Actual/Expected</b>	<b>Expected Rate</b>	<b>Actual Rate</b>
Under 50	272	0.58	1	172.4%	0.00213	0.00368
50-54	265	1.49	0	0.0	0.00562	0.00000
55-59	340	2.81	5	177.9	0.00826	0.01471
60-64	463	6.17	11	178.3	0.01333	0.02376
65-69	349	7.68	10	130.2	0.02201	0.02865
70-74	226	8.33	7	84.0	0.03686	0.03097
75-79	183	11.34	8	70.5	0.06197	0.04372
80-84	108	10.97	10	91.2	0.10157	0.09259
85-89	28	4.15	2	48.2	0.14821	0.07143
90-94	7	1.72	0	0.0	0.24571	0.00000
95 and over	11	3.78	1	26.5	0.34364	0.09091
<b>Total</b>	<b>2,252</b>	<b>59.02</b>	<b>55</b>	<b>93.2%</b>		

**Overall Experience by Year**

<b>Fiscal Year</b>	<b>Exposed Number</b>	<b>Expected Number</b>	<b>Actual Number</b>	<b>Actual/Expected</b>
2006-2007	466	10.78	13	120.6%
2007-2008	459	11.33	12	105.9
2008-2009	451	12.00	11	91.7
2009-2010	441	12.07	9	74.6
2010-2011	435	12.84	10	77.9
<b>Total</b>	<b>2,252</b>	<b>59.02</b>	<b>55</b>	<b>93.2%</b>

It is recommended that the current rates be continued.

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF PROVIDENCE  
CLASS B  
RATES OF POST-RETIREMENT MORTALITY  
FOR BENEFICIARIES OF RETIREES**

**Males and Females Combined**

**Experience by Age**

<b>Age</b>	<b>Exposed Number</b>	<b>Expected Number</b>	<b>Actual Number</b>	<b>Actual/Expected</b>	<b>Expected Rate</b>	<b>Actual Rate</b>
Under 50	39	0.00	1	0.0%	0.00000	0.02564
50-54	50	0.14	0	0.0	0.00280	0.00000
55-59	97	0.36	2	555.6	0.00371	0.02062
60-64	113	0.92	0	0.0	0.00814	0.00000
65-69	114	1.45	1	69.0	0.01272	0.00877
70-74	142	3.03	1	33.0	0.02134	0.00704
75-79	233	8.25	6	72.7	0.03541	0.02575
80-84	289	16.26	17	104.6	0.05626	0.05882
85-89	167	15.93	10	62.8	0.09539	0.05988
90-94	77	11.72	15	128.0	0.15221	0.19481
95 and over	31	6.67	8	119.9	0.21516	0.25806
<b>Total</b>	<b>1,352</b>	<b>64.73</b>	<b>61</b>	<b>94.2%</b>		

**Overall Experience by Year**

<b>Fiscal Year</b>	<b>Exposed Number</b>	<b>Expected Number</b>	<b>Actual Number</b>	<b>Actual/Expected</b>
2006-2007	251	12.37	12	97.0%
2007-2008	261	12.40	15	121.0
2008-2009	270	12.40	11	88.7
2009-2010	279	13.27	9	67.8
2010-2011	291	14.29	14	98.0
<b>Total</b>	<b>1,352</b>	<b>64.73</b>	<b>61</b>	<b>94.2%</b>

Results shown above were based on the mortality table used prior to the 2011 valuation. Mortality was changed for the 2011 valuation and it is recommended that those rates be continued.



**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF PROVIDENCE**  
**CLASS A**  
**PROPOSED RATES OF SEPARATION FROM ACTIVE SERVICE**  
**FOR WITHDRAWAL**

<b>Age</b>	<b>Proposed Rate</b>	<b>Current Rate</b>
19	0.1400	0.1419
20	0.1400	0.1413
21	0.1350	0.1408
22	0.1300	0.1389
23	0.1250	0.1343
24	0.1200	0.1283
25	0.1150	0.1206
26	0.1100	0.1116
27	0.1050	0.0991
28	0.1000	0.0866
29	0.0950	0.0743
30	0.0900	0.0644
31	0.0850	0.0576
32	0.0800	0.0543
33	0.0750	0.0512
34	0.0700	0.0488
35	0.0650	0.0473
36	0.0620	0.0457
37	0.0590	0.0440
38	0.0560	0.0424
39	0.0530	0.0407
40	0.0500	0.0389
41	0.0475	0.0369
42	0.0450	0.0347
43	0.0425	0.0323
44	0.0400	0.0297
45	0.0375	0.0272
46	0.0350	0.0252
47	0.0325	0.0232
48	0.0300	0.0212
49	0.0275	0.0193
50	0.0250	0.0174
51	0.0225	0.0155
52	0.0200	0.0134
53	0.0175	0.0116
54	0.0150	0.0101
55	0.0125	0.0088
56	0.0100	0.0074
57	0.0075	0.0062
58	0.0050	0.0051
59	0.0025	0.0041
60	0.0000	0.0000

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF PROVIDENCE**  
**CLASS A**  
**PROPOSED RATES OF SEPARATION FROM ACTIVE SERVICE**  
**FOR DISABILITY**

<b>Age</b>	<b>Proposed Rate</b>	<b>Current Rate</b>
19-24	0.00020	0.00036
25	0.00025	0.00042
26	0.00030	0.00042
27	0.00030	0.00042
28	0.00035	0.00048
29	0.00040	0.00048
30	0.00045	0.00048
31	0.00050	0.00054
32	0.00055	0.00060
33	0.00060	0.00066
34	0.00065	0.00072
35	0.00075	0.00078
36	0.00080	0.00084
37	0.00085	0.00090
38	0.00090	0.00096
39	0.00095	0.00108
40	0.00100	0.00120
41	0.00120	0.00132
42	0.00130	0.00144
43	0.00145	0.00156
44	0.00160	0.00168
45	0.00175	0.00186
46	0.00190	0.00204
47	0.00200	0.00222
48	0.00205	0.00240
49	0.00210	0.00258
50	0.00220	0.00276
51	0.00230	0.00294
52	0.00240	0.00312
53	0.00250	0.00336
54	0.00260	0.00360
55	0.00275	0.00384
56	0.02900	0.00420
57	0.00300	0.00456
58	0.00320	0.00498
59	0.00340	0.00558
60	0.00360	0.00624
61	0.00380	0.00696
62	0.00400	0.00774
63	0.00450	0.00852
64	0.00480	0.00936
65-74	0.00500	0.01026
75	0.00000	0.00000

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF PROVIDENCE**  
**CLASS A**  
**PROPOSED RATES OF SEPARATION FROM ACTIVE SERVICE**  
**FOR SERVICE RETIREMENT FOR EMPLOYEES WITH LESS THAN 10 YEARS OF SERVICE**

<b>Age</b>	<b>Proposed Rate</b>	<b>Current Rate</b>
40	0.0200	0.0465
41	0.0225	0.0507
42	0.0250	0.0548
43	0.0275	0.0589
44	0.0300	0.0630
45	0.0325	0.0671
46	0.0350	0.0713
47	0.0375	0.0764
48	0.0400	0.0813
49	0.0425	0.0869
50	0.0450	0.0925
51	0.0500	0.0814
52	0.0550	0.0701
53	0.0600	0.0749
54	0.0650	0.0800
55	0.0700	0.0859
56	0.0700	0.0916
57	0.0700	0.0985
58	0.0700	0.1059
59	0.0700	0.1138
60	0.1000	0.1229
61	0.1100	0.1335
62	0.1200	0.1450
63	0.1300	0.1585
64	0.1400	0.1741
65	0.1500	0.2500
66	0.1500	0.2500
67	0.1500	0.2500
68	0.1500	0.2500
69	0.1500	0.2500
70	0.1500	0.2500
71	0.1500	0.2500
72	0.1500	0.2500
73	0.1500	0.2500
74	0.1500	0.2500
75	1.0000	1.0000

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF PROVIDENCE  
CLASS A  
PROPOSED RATES OF SEPARATION FROM ACTIVE SERVICE  
FOR SERVICE RETIREMENT FOR EMPLOYEES WITH 10 OR MORE YEARS OF SERVICE**

<b>Age</b>	<b>Proposed Rate</b>	<b>Current Rate</b>
40	0.0450	0.0465
41	0.0500	0.0507
42	0.0550	0.0548
43	0.0600	0.0589
44	0.0650	0.0630
45	0.0700	0.0671
46	0.0750	0.0713
47	0.0800	0.0764
48	0.0850	0.0813
49	0.0900	0.0869
50	0.0950	0.0925
51	0.1000	0.0814
52	0.1050	0.0701
53	0.1100	0.0749
54	0.1150	0.0800
55	0.1200	0.0859
56	0.1200	0.0916
57	0.1200	0.0985
58	0.1200	0.1059
59	0.1200	0.1138
60	0.1250	0.1229
61	0.1350	0.1335
62	0.1450	0.1450
63	0.1600	0.1585
64	0.1750	0.1741
65	0.2000	0.2500
66	0.2000	0.2500
67	0.2000	0.2500
68	0.2000	0.2500
69	0.2000	0.2500
70	0.2000	0.2500
71	0.2000	0.2500
72	0.2000	0.2500
73	0.2000	0.2500
74	0.2000	0.2500
75	1.0000	1.0000

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF PROVIDENCE**  
**CLASS B**  
**PROPOSED RATES OF SEPARATION FROM ACTIVE SERVICE**  
**FOR WITHDRAWAL**

<b>Age</b>	<b>Proposed Rate</b>	<b>Current Rate</b>
19	0.0300	0.0273
20	0.0250	0.0258
21	0.0250	0.0243
22	0.0250	0.0228
23	0.0250	0.0213
24	0.0200	0.0198
25	0.0190	0.0183
26	0.0180	0.0167
27	0.0170	0.0151
28	0.0160	0.0135
29	0.0150	0.0120
30	0.0140	0.0104
31	0.0130	0.0087
32	0.0120	0.0073
33	0.0110	0.0061
34	0.0100	0.0052
35	0.0090	0.0046
36	0.0080	0.0040
37	0.0070	0.0035
38	0.0065	0.0032
39	0.0060	0.0029
40	0.0055	0.0029
41	0.0051	0.0028
42	0.0047	0.0028
43	0.0043	0.0027
44	0.0039	0.0026
45	0.0035	0.0024
46	0.0031	0.0020
47	0.0027	0.0016
48	0.0023	0.0012
49	0.0019	0.0008
50	0.0015	0.0004
51	0.0012	0.0002
52	0.0009	0.0000
53	0.0006	0.0000
54	0.0003	0.0000
55	0.0000	0.0000

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF PROVIDENCE  
CLASS B  
PROPOSED RATES OF SEPARATION FROM ACTIVE SERVICE  
FOR SERVICE RETIREMENT**

<b>Age</b>	<b>Proposed Rate</b>	<b>Current Rate</b>
40	0.05500	0.07403
41	0.05500	0.07442
42	0.05500	0.07481
43	0.05500	0.07520
44	0.05500	0.07549
45	0.05750	0.07599
46	0.06000	0.07650
47	0.06250	0.07724
48	0.06500	0.07813
49	0.06750	0.07903
50	0.07000	0.08004
51	0.07250	0.08123
52	0.07500	0.08269
53	0.07750	0.08438
54	0.08000	0.08635
55	0.10000	0.08860
56	0.12500	0.09124
57	0.15000	0.09439
58	0.17500	0.09788
59	0.25000	0.10238
60	0.50000	0.25000
61	0.50000	0.25000
62	0.50000	0.25000
63	0.50000	0.25000
64	0.50000	0.25000
65	1.00000	1.00000

**EMPLOYEES' RETIREMENT SYSTEM OF THE CITY OF PROVIDENCE**  
**CLASS B**  
**PROPOSED RATES OF POST-RETIREMENT MORTALITY**  
**FOR HEALTHY RETIREES**

Age	Male Healthy Retirees		Female Healthy Retirees		Age	Male Healthy Retirees		Female Healthy Retirees	
	Proposed Rate	Current Rate	Proposed Rate	Current Rate		Proposed Rate	Current Rate	Proposed Rate	Current Rate
19	0.000221	0.000221	0.000138	0.000138	60	0.005894	0.004808	0.004455	0.004550
20	0.000231	0.000231	0.000136	0.000136	61	0.006864	0.005589	0.005215	0.005233
21	0.000244	0.000244	0.000134	0.000134	62	0.007843	0.006376	0.006103	0.005992
22	0.000255	0.000255	0.000135	0.000135	63	0.009155	0.007446	0.007182	0.006884
23	0.000272	0.000272	0.000140	0.000140	64	0.010272	0.008389	0.008222	0.007758
24	0.000286	0.000286	0.000146	0.000146	65	0.011557	0.009473	0.009359	0.008736
25	0.000304	0.000304	0.000154	0.000154	66	0.013336	0.010947	0.010655	0.009860
26	0.000333	0.000333	0.000166	0.000166	67	0.014847	0.012213	0.011896	0.010948
27	0.000344	0.000344	0.000173	0.000173	68	0.016125	0.013291	0.013246	0.012102
28	0.000354	0.000354	0.000182	0.000182	69	0.017808	0.014727	0.014750	0.013375
29	0.000371	0.000371	0.000192	0.000192	70	0.019481	0.016167	0.016772	0.015069
30	0.000653	0.000400	0.000237	0.000214	71	0.021359	0.017888	0.018272	0.016373
31	0.000720	0.000449	0.000277	0.000259	72	0.023437	0.019862	0.020324	0.018212
32	0.000788	0.000506	0.000310	0.000296	73	0.025774	0.022123	0.022060	0.019820
33	0.000854	0.000568	0.000342	0.000326	74	0.028433	0.024681	0.024317	0.021966
34	0.000917	0.000632	0.000375	0.000352	75	0.032078	0.028138	0.026094	0.023743
35	0.000978	0.000696	0.000411	0.000377	76	0.035471	0.031362	0.028540	0.026160
36	0.001035	0.000757	0.000449	0.000399	77	0.040019	0.035636	0.031841	0.029427
37	0.001086	0.000814	0.000489	0.000421	78	0.045102	0.040451	0.034872	0.032439
38	0.001112	0.000850	0.000532	0.000445	79	0.050787	0.045920	0.038285	0.035813
39	0.001135	0.000881	0.000577	0.000472	80	0.057124	0.052121	0.042239	0.039587
40	0.001158	0.000912	0.000639	0.000514	81	0.064648	0.059584	0.046795	0.043815
41	0.001186	0.000945	0.000707	0.000564	82	0.072956	0.067993	0.051974	0.048573
42	0.001221	0.000984	0.000781	0.000620	83	0.080416	0.075792	0.057816	0.053933
43	0.001261	0.001030	0.000856	0.000682	84	0.090313	0.086094	0.064421	0.059983
44	0.001308	0.001084	0.000933	0.000749	85	0.099294	0.095566	0.073234	0.068252
45	0.001362	0.001146	0.000988	0.000801	86	0.109028	0.105955	0.083110	0.077746
46	0.001409	0.001202	0.001041	0.000853	87	0.122170	0.119892	0.094139	0.088560
47	0.001460	0.001262	0.001093	0.000905	88	0.136764	0.135544	0.104165	0.098641
48	0.001517	0.001326	0.001169	0.000979	89	0.149643	0.149793	0.117126	0.111868
49	0.001579	0.001392	0.001251	0.001058	90	0.167085	0.168603	0.128328	0.123630
50	0.001647	0.001460	0.001369	0.001169	91	0.180521	0.183643	0.139564	0.135762
51	0.001834	0.001637	0.001495	0.001320	92	0.198683	0.203361	0.150644	0.147980
52	0.001959	0.001745	0.001671	0.001501	93	0.213451	0.219375	0.164887	0.163416
53	0.002156	0.001908	0.001869	0.001713	94	0.228303	0.235364	0.175098	0.175273
54	0.002383	0.002091	0.002096	0.001963	95	0.248784	0.256478	0.184636	0.186501
55	0.002805	0.002422	0.002361	0.002295	96	0.272216	0.272216	0.196923	0.196923
56	0.003392	0.002868	0.002696	0.002723	97	0.287507	0.287507	0.210765	0.210765
57	0.003927	0.003274	0.003051	0.003131	98	0.308741	0.308741	0.219291	0.219291
58	0.004560	0.003758	0.003419	0.003531	99	0.323342	0.323342	0.226576	0.226576
59	0.005173	0.004237	0.003878	0.003997	100	0.337392	0.337392	0.232530	0.232530