

**Government of Guam  
Retirement Fund**

**Actuarial Experience Study  
October 1, 2002 through  
September 30, 2007**

**Prepared by:**

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**July 1, 2008**



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**Government of Guam Retirement Fund –  
Actuarial Experience Study  
October 1, 2002 through September 30, 2007**

At the request of the Trustees, we have completed an actuarial experience study for the Government of Guam Retirement Fund for the period October 1, 2002 through September 30, 2007. The attached report presents our review of the Fund's actuarial assumptions in relation to actual experience and our recommendations for revisions to these assumptions where appropriate.

In preparing our report, we relied on financial information and employee data furnished to us by the Government of Guam Retirement Fund. While Milliman has not audited the financial and census data, they have been reviewed for reasonableness and are, in our opinion, sufficient and reliable for the purposes of our calculations. If any of this information as summarized in this report is inaccurate or incomplete, the results shown could be materially affected and this report may need to be revised.

The actuarial methods and assumptions used as well as the supporting data upon which this experience study is based are set forth in the following report. In our opinion, each proposed actuarial assumption, method, and technique is reasonable taking into account the experience of the Plan and reasonable expectations. Nevertheless, the emerging costs will vary from those presented in this report to the extent actual experience differs from that projected by the actuarial assumptions.

The results of this study are applicable only for the current period and are intended to be used only by the plan sponsor for the specific purposes described herein. Accordingly, this report may not be distributed outside the Fund except as required by law. Reliance on information contained in this report by anyone for anything other than the intended purpose puts the relying entity at risk of being misled. If distribution of the report is made outside of the plan sponsor, the report must be provided in its entirety. This report is a complex, technical analysis that assumes a high level of knowledge concerning GGRF operations, and uses GGRF data, which Milliman has not audited. Any third party recipient of Milliman's work product who desires professional guidance should not rely upon Milliman's work product, but should engage qualified professionals for advice appropriate to its own specific needs.

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July 1, 2008  
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On the basis of the foregoing, we hereby certify that, to the best of our knowledge and belief, all costs, liabilities, and other factors under the Plan were determined in accordance with generally accepted actuarial principles and practices which are consistent with the applicable Actuarial Standards of Practice of the American Academy of Actuaries. We further certify that, to the best of our knowledge, the report is complete and accurate and the information presented herein, in our opinion, fully and fairly discloses the actuarial experience of the Plan.

The undersigned is a member of the American Academy of Actuaries and meets the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

Sincerely,

A handwritten signature in black ink that reads "Richard A. Wright". The signature is written in a cursive style with a large, prominent "R" and "W".

Richard A. Wright, FSA, MAAA  
Consulting Actuary

RAW:jh

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### *Introduction*

Milliman, Inc. has been retained by the Government of Guam Retirement Fund to provide an actuarial experience study of the retirement fund for the period October 1, 2002 through September 30, 2007. The purpose of the study is to:

- Compare the actual experience of the Fund during the study period with the experience predicted by the actuarial assumptions.
- Review the current set of actuarial assumptions and propose changes where appropriate. Any changes that are adopted would first be effective with the actuarial valuation as of September 30, 2008.

An actuarial valuation of the fund is performed annually to determine the present value of future benefits and the required employer contribution rate. The valuation makes certain assumptions regarding future events. These include economic assumptions such as investment return and member salary increases, and demographic assumptions such as life expectancy and rates of retirement.

### *Key Findings*

1. While individual payroll increases for defined benefit participants have matched well with the current assumption, the total payroll for both defined benefit and defined contribution participants has not increased over the last 10 years. As a result, we propose lowering the assumption for future overall payroll growth from 3.5% to 3.0%. [See Section C]
2. There have been more retiree deaths during the study period than expected. Therefore, we propose changing the mortality table to assume lower life expectancies. [See Sections E and F]
3. There have been fewer disability retirements during the study period than expected. Therefore, we propose changing the assumption to assume fewer future disabilities. [See Section G]
4. The Fund experienced more employee withdrawals during the study period than expected. Also, the pattern of withdrawals appears more closely correlated with service than by age. Therefore, we propose changing the assumption from an age-based table to a service based table, to better match the pattern of withdrawals. [See Section H]
5. More participants were married at the time of initial retirement than predicted by the assumption. Therefore, we propose increasing the marital status assumption. [See Section K]
6. The current asset valuation method closely matches market value. As such, gains and losses (both realized and unrealized) are recognized immediately. This can lead to large potential swings in required contributions and unfunded liabilities. As a way to help stabilize the required contribution rate, we propose changing the asset valuation method to a method that reflects unexpected investment gains and losses over a 5 year period. [See Section M]

The impact of the proposed changes is estimated below, and is based upon projected valuation results as of September 30, 2008. To show the sensitivity of the projections to adverse investment returns, we have estimated the valuation results as of September 30, 2008, assuming investment returns of -4%, 0% and 7% for the fiscal year ending September 30, 2008.

	<i>Estimated as of 9/30/2008 (\$millions)</i>		
	<i>Assuming 2007/08 Investment Return of</i>		
	<i>-4%</i>	<i>0%</i>	<i>7%</i>
<b>Projected Unfunded Accrued Liability</b>			
Before proposed changes	\$ 1,402.4	\$ 1,346.4	\$ 1,248.3
1. Lower payroll increases (3.5% to 3.0%)	0.0	0.0	0.0
2. Increase retiree mortality	(57.3)	(57.3)	(57.3)
3. Reduce rates of disability	0.7	0.7	0.7
4. Modify withdrawal rates	23.8	23.8	23.8
5. Increase percent married at retirement	7.3	7.3	7.3
6. Change asset valuation method	<u>(43.5)</u>	<u>1.3</u>	<u>79.8</u>
After proposed changes	\$ 1,333.4	\$ 1,322.2	\$ 1,302.6
<i>Summary</i>			
Economic assumptions (item 1)	\$ 0.0	\$ 0.0	\$ 0.0
Demographic assumptions (items 2 to 5)	(25.5)	(25.5)	(25.5)
Method changes (item 6)	<u>(43.5)</u>	<u>1.3</u>	<u>79.8</u>
Total	\$ (69.0)	\$ (24.2)	\$ 54.3
<b>Projected Employer Contribution Rate</b>			
Before proposed changes	28.32%	27.43%	25.87%
1. Lower payroll increases (3.5% to 3.0%)	1.26%	1.21%	1.13%
2. Increase retiree mortality	(1.11%)	(1.11%)	(1.11%)
3. Reduce rates of disability	(0.02%)	(0.02%)	(0.02%)
4. Modify withdrawal rates	0.16%	0.16%	0.16%
5. Increase percent married at retirement	0.16%	0.16%	0.16%
6. Change asset valuation method	<u>(0.73%)</u>	<u>-0.03%</u>	<u>1.34%</u>
After proposed changes	28.04%	27.86%	27.53%
<i>Summary</i>			
Economic assumptions (item 1)	1.26%	1.21%	1.13%
Demographic assumptions (items 2 to 5)	(0.81%)	(0.81%)	(0.81%)
Method changes (item 6)	<u>(0.73%)</u>	<u>0.03%</u>	<u>1.34%</u>
Total	(0.28%)	0.43%	1.66%

Appendix A contains a complete summary of all current and proposed assumptions, including current assumptions that we propose remain unchanged.

**A. Investment Return**

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Current Assumption:	7.0% (effective 2003)
1997-2001 Study:	Reduced assumption from 8.0% to 7.5%
Current Best Estimate Range:	6.28% to 8.60%
Proposed Assumption:	7.0% (no change)

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Actuarial Standard of Practice No. 27 (ASOP 27), which was adopted by the Actuarial Standards Board on December 1996, provides guidance for selecting pension plan economic assumptions. We have calculated a best estimate range for the investment return assumption in accordance with the guidance provided by this standard.

Milliman’s expected annual returns on various asset classes are shown below. The target asset allocation is the expected long-term asset allocation based on the Fund’s current investment policy. The expected returns are net of investment fees.

<i>Asset Class</i>	<i>(a)</i> <i>Target</i> <i>Asset</i> <i>Allocation</i>	<i>x</i>	<i>(b)</i> <i>Expected</i> <i>Nominal</i> <i>Return</i> <sup>1</sup>	<i>=</i>	<i>(c)</i> <i>Component</i> <i>Return</i>
U.S. Equities (large cap)	30%		9.10%		2.73%
U.S. Equities (small cap)	10%		10.69%		1.07%
Non-U.S. Equities	17%		9.15%		1.56%
Non-U.S. Equities (emerging markets)	3%		11.38%		0.34%
U.S. Fixed Income (aggregate)	30%		5.22%		1.57%
Real Estate (REITs)	10%		8.62%		<u>0.86%</u>
Expected average return for one year					8.13%
Expected geometric mean (50 years)					7.45%
Expected annual standard deviation					12.25%

<sup>1</sup> Assumes annual inflation of 3.0%.

An important distinction with long-term rates of return on assets is the difference between arithmetic means and geometric means. The arithmetic mean is determined by summing the periodic returns and dividing by the number of periods. The geometric mean is determined by taking the product of each year's return, and taking the nth root of the product, where n is the number of periods.

For example, a fund may have an expected 1 year average return of 8%, and experience actual returns over a 5 year period of 5%, 10%, -5%, 10%, and 20%. The arithmetic mean of those 5 year returns is 8%. However, if \$1,000 was invested at the start of the 5 year period, and it earned those

rates of return, the accumulated sum at the end of the 5-year period is \$1,448, which translates into a geometric mean of 7.69%.

Using the expected returns and standard deviations of each asset class, we have calculated the geometric mean of the portfolio to be 7.45%.

**Best Estimate Range**

The actual return of the portfolio will, of course, vary each year. In any given year, the difference between actual and expected results may be large. However, over longer time horizons, the accumulated returns should approach the expected long term returns. We have developed the following ranges of returns for different time horizons.

	Time Horizon (years)					
	1	5	10	20	30	50
<b>25<sup>th</sup> Percentile</b>	-0.45%	3.84%	4.88%	5.62%	5.95%	6.28%
<b>75<sup>th</sup> Percentile</b>	15.94%	11.16%	10.06%	9.28%	8.94%	8.60%

The 25<sup>th</sup> percentile indicates the rate at which there is a 25% probability that the investment return of the portfolio will be less than that rate. Conversely, the 75<sup>th</sup> percentile indicates the rate at which there is a 25% probability that the investment return of the portfolio will exceed that rate. Overall, there is a 50% probability that the investment return of the portfolio will fall within the 25<sup>th</sup> and 75<sup>th</sup> percentiles. We have defined the best estimate range to be the 25<sup>th</sup> to 75<sup>th</sup> percentile range associated with a 50-year time horizon.

**Investment Management Fees**

Investment management fees typically vary according to the dollar value of assets managed. Actively managed accounts have higher fees than passively managed (indexed) accounts. Over the long run, it is reasonable to assume that investors will only pay active management fees if their active managers outperform their passive benchmarks by at least the difference between their active fee and the comparable fee for an index fund. Otherwise, the investor has the option to use an index fund.

We have assumed that long-term average returns net of active investment management fees can be approximated by returns on indexed investments net of their fees. The expected returns shown above are net of fees of 0.10% for fixed income, 0.06% for US equities, and 0.35% for non-US equities. For "alternative" asset classes such as real estate, the expected returns are net of the expected fee levels for that asset class.

**Recommendation**

Based upon the expected geometric mean return of 7.45%, and a best estimate range of 6.28% to 8.60%, the recommended assumption range is 7.0% to 7.25%. We recommend keeping the current assumption of 7.0%.

*This work product was prepared solely for the plan sponsor for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work.*



**B. Member Salary Increases**

Current Assumption: Ranges from 8.5% for employees with between 0 and 5 years of service, to 4.0% for members with over 20 years of service (effective 2000)

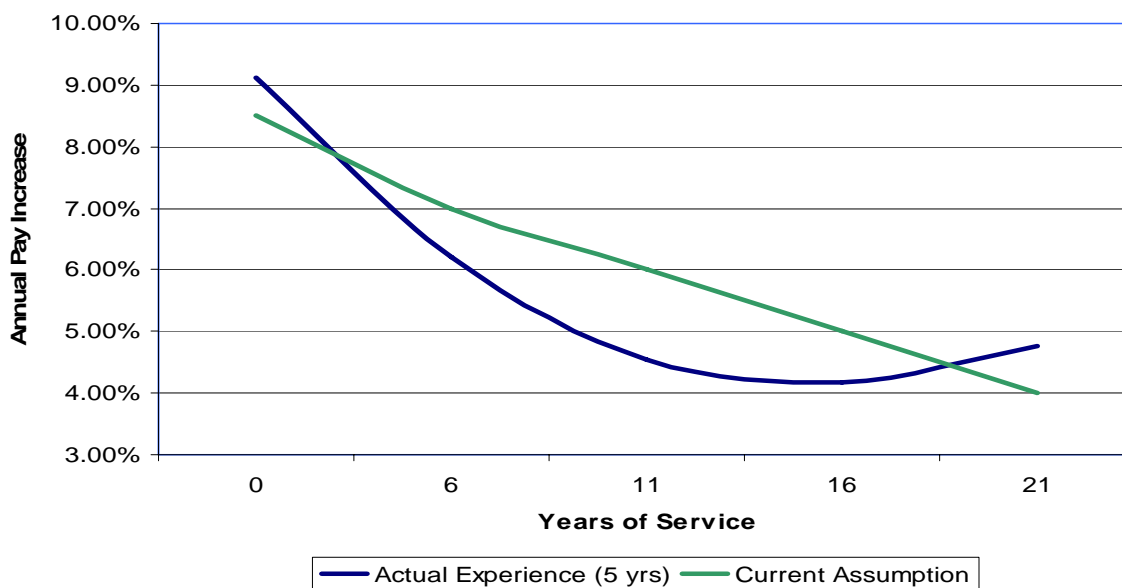
1997-2001 Study: Continued use of assumption developed in 2000

Proposed Assumption: No change to current assumption

Salaries of retirement fund members are assumed to increase each year by a percentage that depends on the member’s years of service with the Government of Guam. The current assumption was developed for the September 30, 2000 actuarial valuation based on an analysis of the pay grades used by the Government of Guam combined with salary inflation.

<i>Years of Service</i>	<i>9/30/07 Count</i>	<i>Current Assumption</i>	<i>Average Annual Increase</i>			
			<i>Last 1 Year</i>	<i>Last 5 Years</i>	<i>1997-2001</i>	<i>Last 10 Years<sup>1</sup></i>
0 to 5	78	8.5%	13.3%	9.1%	8.0%	8.5%
6 to 10	101	7.0%	10.7%	6.2%	4.4%	5.3%
11 to 15	961	6.0%	7.5%	4.6%	5.6%	5.1%
16 to 20	1,481	5.0%	5.3%	4.2%	3.5%	3.8%
Over 20	1,457	4.0%	5.3%	4.8%	3.2%	4.0%
Average for 30-yr career		5.8%	8.0%	5.7%	4.7%	5.2%

<sup>1</sup> Includes data from Deloitte and Touche experience study 1997-2001.



### **Recommendation**

The average annual increases over the 5-year study period were higher than the current assumption for employees with low service (less than 5 years) and high service (more than 20 years). For employees with between 5 and 20 years of service, the average increases were lower than expected.

Overall, the actual salary increases over the 5 year study period would produce an average salary increase of 5.7% for a 30-year career. This compares with an average salary increase of 5.8% for a 30-year career using the current assumptions. Therefore, we do not recommend revising the current assumption.

**C. Payroll Growth**

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Current Assumption: 3.5% per year (effective 2003)

1997-2001 Study: Maintained assumption of 4.5%

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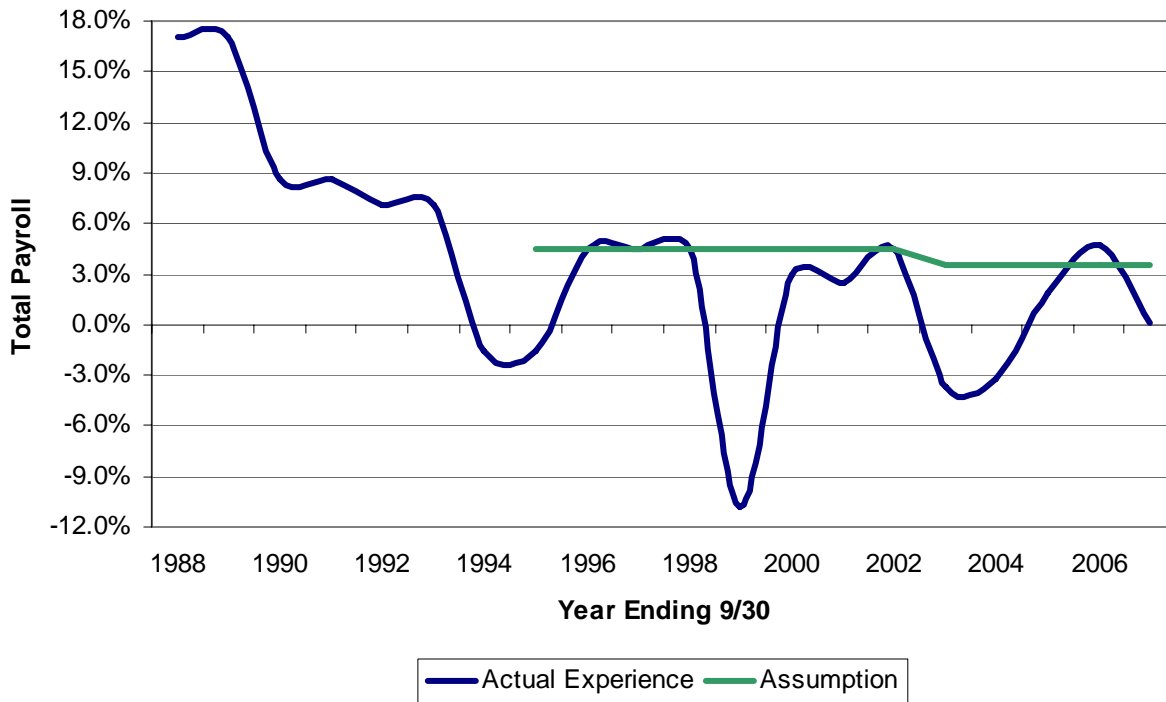
Proposed Assumption: 3.0% per year

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Payroll growth for the past 20 fiscal years is summarized below. For the years from 1987 to 1996, the payroll growth is smoothed over 2 years, since actuarial valuations were done every other year.

<i>Fiscal Year Ending</i>	<i>Total Government Covered Payroll</i> <sup>1</sup>	<i>Percentage Increase</i> <sup>1</sup>
9/30/2007	\$ 377,049,000	0.1%
9/30/2006	376,604,000	4.7%
9/30/2005	359,850,000	1.9%
9/30/2004	353,229,000	-3.2%
9/30/2003	364,936,000	-3.7%
9/30/2002	378,916,000	4.5%
9/30/2001	362,599,000	2.5%
9/30/2000	353,755,000	3.0%
9/30/1999	343,451,000	-10.8%
9/30/1998	385,035,000	4.5%
9/30/1997	368,455,000	4.5%
9/30/1996	352,589,000	4.5%
9/30/1995	337,406,000	-1.6%
9/30/1994	342,892,000	-1.6%
9/30/1993	348,467,000	7.1%
9/30/1992	325,366,000	7.1%
9/30/1991	303,796,000	8.6%
9/30/1990	279,738,000	8.6%
9/30/1989	257,586,000	17.0%
9/30/1988	220,159,000	17.0%
Average for Last 5 Years		-1.0%
Average for Last 10 Years		0.2%
Average for Last 20 Years		3.5%

<sup>1</sup> Information for the years from 1988 to 2001 was derived from the 1997-2001 experience study.



### Recommendation

The current assumption of 3.5% has been in effect since 2003. From 1995 to 2002, the payroll growth assumption was 4.5%. The current assumption is based upon assumed inflation of 3.0%, wage productivity growth of 0.5%, and personnel growth of 0%.

Over the last 10 years, overall payroll growth has been flat. However, unless there is a decrease in the government workforce, we do not believe a payroll growth assumption of 0% is sustainable in light of inflationary pressures. We do propose to lower the assumption from 3.5% to 3.0%, by removing the wage productivity growth factor of 0.5%.

**D. Administrative Expenses**

Current Assumption:	Prior year's administrative expenses, net of adjustment for bad debts
1997-2001 Study:	This assumption was not reviewed
Proposed Assumption:	No change

Administrative expenses are a component of the required employer contribution. The administrative expenses for the past 5 fiscal years are summarized below, both before and after the adjustment for bad debts.

<i>Fiscal Year Ending</i>	<i>Total Administrative Expenses</i>	<i>Bad Debts / Recoveries</i>	<i>Net Administrative Expenses</i>	<i>% of DB Payroll</i>
9/30/2007	\$ 2,805,167	\$ (632,811)	\$ 2,172,356	1.18%
9/30/2006	3,659,794	(664,688)	2,995,106	1.62%
9/30/2005	3,165,537	(285,015)	2,880,522	1.60%
9/30/2004	3,082,551	(482,894)	2,599,657	1.28%
9/30/2003	3,533,184	(552,746)	2,980,438	1.33%

**Recommendation**

Administrative expenses net of the adjustment for bad debts have been relatively stable for the last 5 years, with the exception of the most recent year. The current assumption properly captures fluctuations in expenses as they occur. Therefore, we recommend no change to the current assumption, which is to assume future administrative expenses will equal the most recent year's expenses. This assumption was not reviewed in the prior experience study.

**E. Healthy Retiree Mortality**

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Current Assumption:	1994 U.S. Uninsured Pensioners mortality table (Males +2, Females +0)
1997-2001 Study:	Changed table from 1983 GAM (+2, +0) to 1994 UP (+2, +0)
Proposed Assumption:	RP-2000 mortality table (Males +3, Females +1)

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The current mortality assumption for non-disabled retired members and surviving spouses is the 1994 U.S. Uninsured Pensioners mortality table using the male rates for both males and females. The mortality rates are set forward by 2 years for males. For example, the life expectancy for a 65 year old male is calculated as if he was age 67.

The following summarizes total mortality experience for non-disabled retired members and surviving spouses during the study period and compares it with expected mortality based on the current assumption. Mortality experience for active members was not included in the review, because withdrawal and mortality experience are combined for active members.

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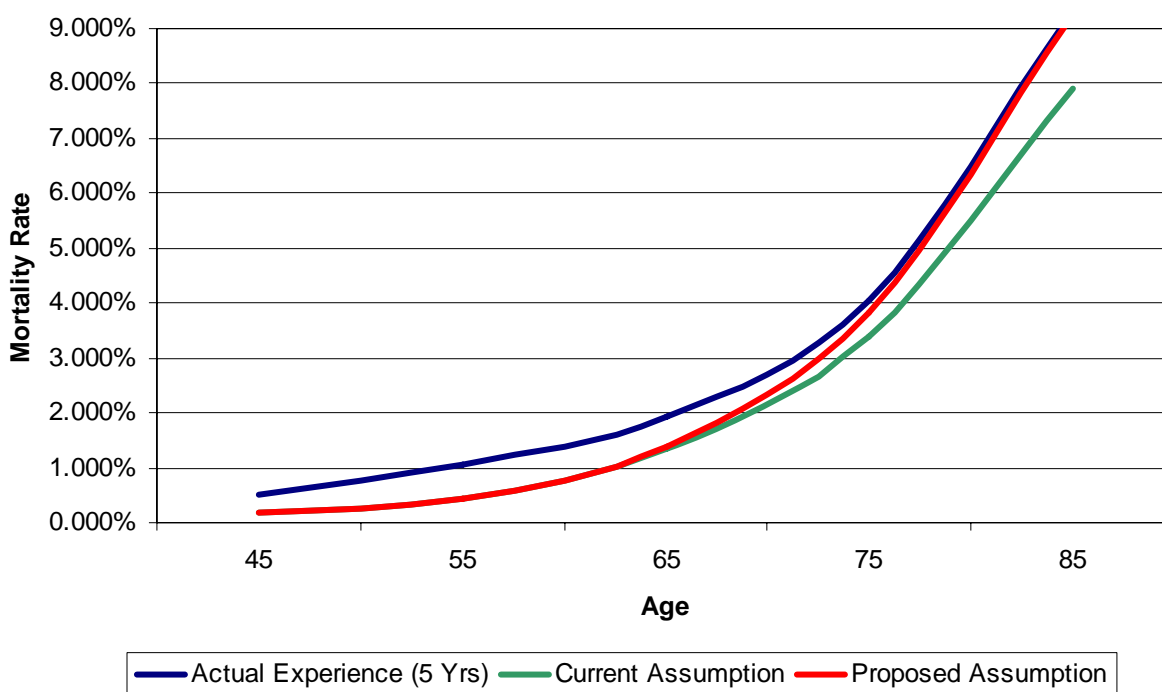
	<i>Male Retirees</i>	<i>Female Retirees</i>	<i>Retirees Total</i>	<i>Male Surviving Spouses</i>	<i>Female Surviving Spouses</i>	<i>Surviving Spouses Total</i>
<b><u>Current Study</u></b>						
Actual Deaths	375	204	579	45	153	198
Expected Deaths	311	148	459	32	93	125
Actual/Expected Ratio	121%	138%	126%	141%	165%	158%
<b><u>1997-2001 Study</u></b>						
Actual Deaths	243	282	525	n/a	n/a	n/a
Expected Deaths	286	317	603	n/a	n/a	n/a
Actual/Expected Ratio	85%	89%	87%	n/a	n/a	n/a

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**Recommendation**

As shown above, the actual mortality for retirees and surviving spouses is higher than the mortality predicted by the current assumption. We recommend revising the non-disabled mortality assumption to the RP-2000 mortality table, set forward by 3 years for males and 1 year for females, in order to conform more closely to actual experience. A comparison of actual experience with mortality expected under the proposed assumption is shown below.

	<i>Male Retirees</i>	<i>Female Retirees</i>	<i>Retirees Total</i>	<i>Male Surviving Spouses</i>	<i>Female Surviving Spouses</i>	<i>Surviving Spouses Total</i>
Actual Deaths	375	204	579	45	153	198
Expected Deaths (Proposed Assumption)	324	179	503	34	111	145
Actual/Expected Ratio	116%	114%	115%	132%	138%	137%



The current and proposed mortality rates are shown in Appendix A – Table 1. The table below shows the life expectancy for the current and proposed assumptions for a healthy 60 year old retiree in pay status.

	<i>Average Life Expectancies</i>	
	<i>Current Assumption UP94 (+2,+0)</i>	<i>Proposed Assumption RP 2000 (+3,+1)</i>
Male age 60	78.8	78.4
Female age 60	84.1	82.6

**F. Disabled Retiree Mortality**

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Current Assumption:	1984 U.S. Uninsured Pensioners table (Males +10, Females +8)
1997-2001 Study:	Maintained current assumption
Proposed Assumption:	RP 2000 Disability mortality table with no age adjustments

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The current mortality assumption for disabled retired members is the 1984 Uninsured Pensioners mortality table for Males, with rates set forward 10 years for males and 8 years for females. For example, the life expectancy for a 65 year old female is calculated as if she were age 73.

The following summarizes total mortality experience for disabled retired members during the study period and compares it with expected mortality based on the current assumption. For comparison, the mortality experience for disabled retired members from the prior experience study (1997-2001) is also shown. The prior study did not recommend revising the disabled mortality assumption.

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	<i>Male Disabled Retirees</i>	<i>Female Disabled Retirees</i>	<i>Disabled Retirees Total</i>	<i>Prior Study: 1997-2001</i>		
				<i>Male Disabled Retirees</i>	<i>Female Disabled Retirees</i>	<i>Disabled Retirees Total</i>
Actual Deaths	73	57	130	50	35	85
Expected Deaths	62	62	124	54	47	101
Actual/Expected Ratio	118%	92%	105%	93%	74%	84%

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**Recommendation**

Although the overall expected deaths match closely to recent experience, the age curve (see next page) does not replicate closely with actual experience, and is very steep at older ages. We recommend revising the mortality assumption for disabled retirees to the RP-2000 disability mortality table, with no age adjustments. A comparison of actual experience with mortality expected under the proposed assumption is shown below.

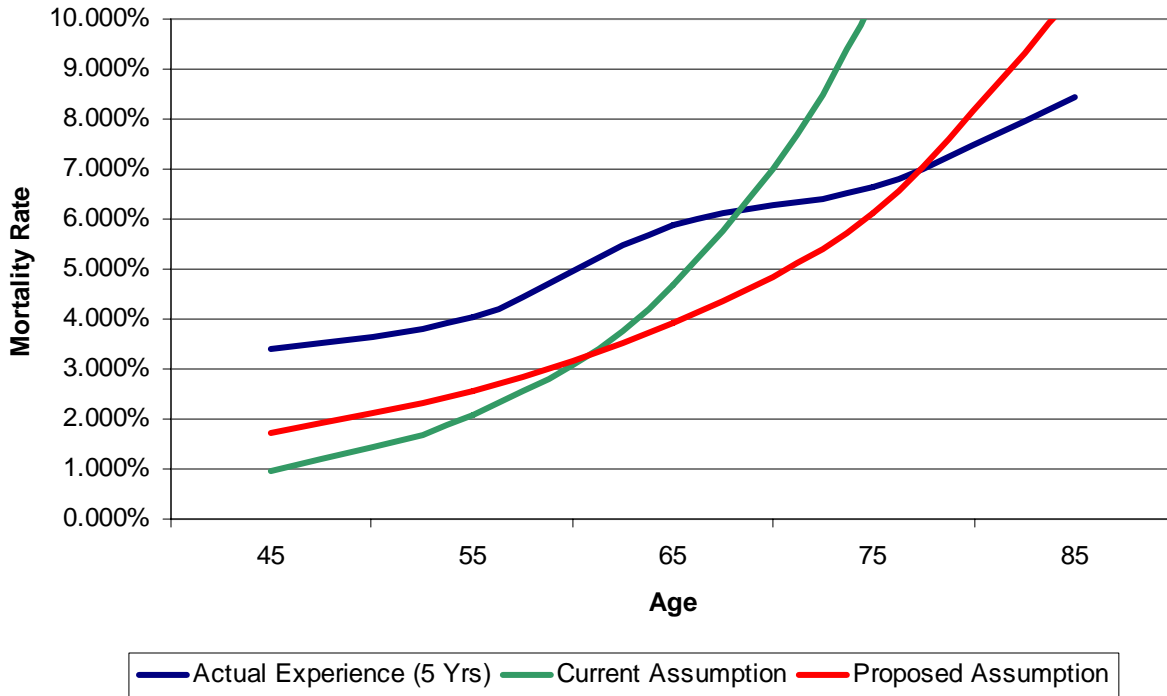
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	<i>Male Disabled Retirees</i>	<i>Female Disabled Retirees</i>	<i>Disabled Retirees Total</i>
Actual Deaths	73	57	130
Expected Deaths	59	36	95
Actual/Expected Ratio	124%	158%	137%

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The current and proposed mortality rates are shown in Appendix A – Table 2.





The table below shows the life expectancy for the current and proposed assumptions for a disabled 60 year old retiree in pay status.

	<i>Average Life Expectancies</i>	
	<i>Current Assumption UP84 (+10,+8)</i>	<i>Proposed Assumption RP 2000 Disability</i>
Male age 60	71.7	73.4
Female age 60	72.3	78.0

**G. Disability Incidence**

Current Assumption:	1974-78 Society of Actuaries Long Term Disability Non-Jumbo table with rates increased for males by 30%
1997-2001 Study:	Maintained current assumption
Proposed Assumption:	1974-78 Society of Actuaries Long Term Disability Non-Jumbo table with no adjustment for males

The current assumption for the incidence of disability among active members is the 1974-78 Society of Actuaries Long Term Disability Non-Jumbo table with rates increased for males by 30%.

The following summarizes the incidence of disability for active members during the study period and compares it with expected disability based on the current assumption. For comparison, the disability experience for active members from the prior experience study (1997-2001) is also shown. The prior study did not recommend revising the disability incidence assumption.

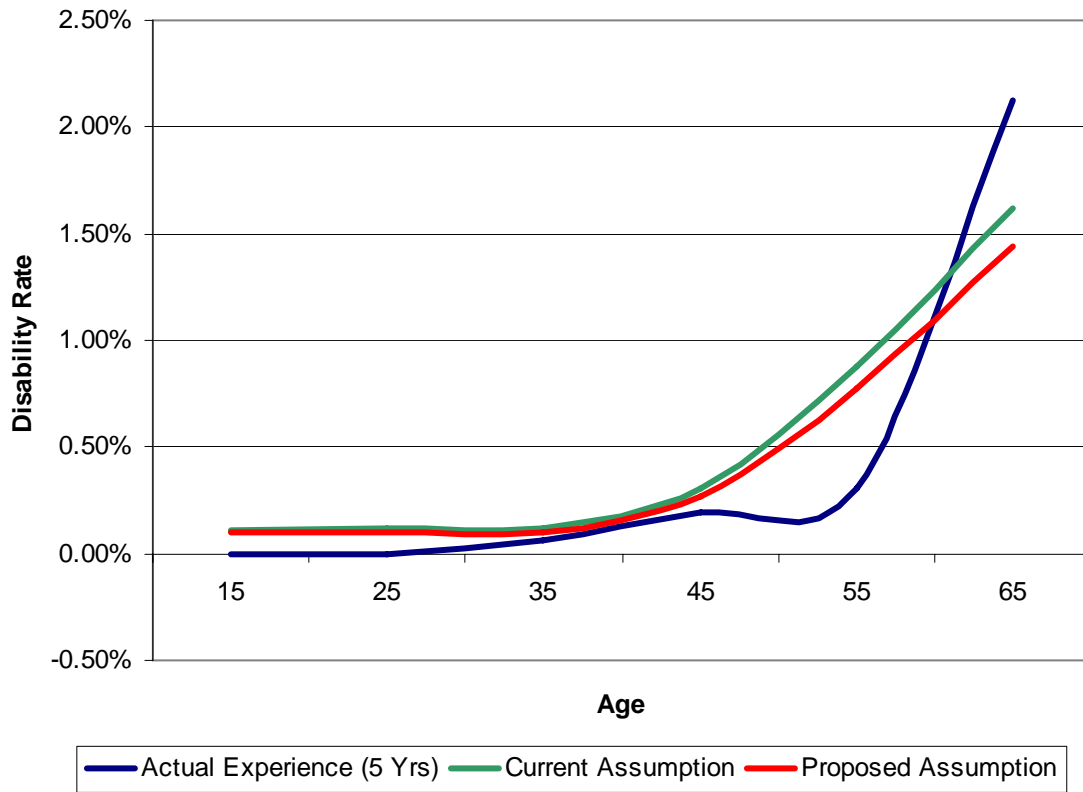
	<i>Male Active Members</i>	<i>Female Active Members</i>	<i>Active Members Total</i>	<i>Prior Study: 1997-2001</i>		
				<i>Male Active Members</i>	<i>Female Active Members</i>	<i>Active Members Total</i>
Actual Disability	38	33	71	42	47	89
Expected Disability	64	54	118	80	59	139
Actual/Expected Ratio	59%	61%	60%	53%	80%	64%

**Recommendation**

As shown above, the actual incidence of disability has been substantially lower than the incidence of disability predicted by the current assumption. In order to reduce the discrepancy, we recommend eliminating the 30% increase that had been applied to the male rates. A comparison of actual experience with the incidence of disability expected under the proposed assumption is shown below.

	<i>Male Active Members</i>	<i>Female Active Members</i>	<i>Active Members Total</i>
Actual Disability	38	33	71
Expected Disability	49	54	103
Actual/Expected Ratio	78%	61%	69%

The current and proposed disability rate tables are provided in Appendix A – Table 3.



**H. Active Withdrawal and Mortality**

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Current Assumption:	Rates based upon actual experience that vary by age
1997-2001 Study:	Maintained current assumption
Proposed Assumption:	Rates based upon actual experience that vary by service

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In reviewing the withdrawal assumption, we have combined active member withdrawal with mortality, since the records reviewed for this study do not distinguish between active members who withdrew and received a return of contributions and those who died. Withdrawal occurs primarily for relatively young members, so the proportion of mortality in the combined totals is small (under the current assumption, it would be approximately 10%).

The following summarizes total withdrawal/mortality experience for active members during the study period and compares it with expected withdrawal/mortality based on the current assumption. For comparison, the withdrawal/mortality experience for active members from the prior experience study (1997-2001) is also shown. Note that the prior experience study did not include a breakdown of expected withdrawals/deaths into the respective decrements.

	<i>Male Active Members</i>	<i>Female Active Members</i>	<i>Active Members Total</i>	<i>Prior Study: 1997-2001</i>		
				<i>Male Active Members</i>	<i>Female Active Members</i>	<i>Active Members Total</i>
Actual Withdrawals/Deaths	864	707	1,571	777	722	1,499
Expected Withdrawals	365	411	776	-	-	-
Expected Deaths	52	25	77	-	-	-
Expected Withdrawals/Deaths	417	436	853	743	784	1,527
Actual/Expected Ratio	207%	162%	184%	105%	92%	98%

**Recommendation**

*Active Withdrawal*

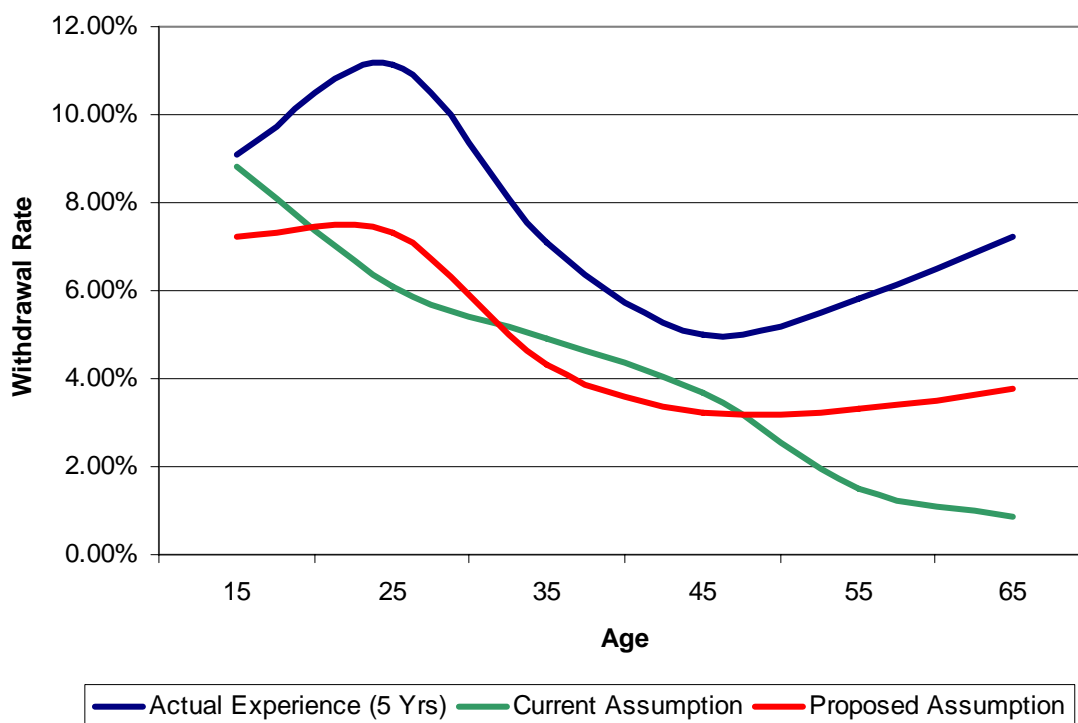
The actual withdrawal/mortality experience has been substantially higher than predicted by the current assumption. We therefore recommend updating the withdrawal assumption to a new set of rates based on recent withdrawal experience. Our review of the withdrawal patterns for active members indicates that withdrawal rates are more strongly correlated with the number of years of service than with the member's age. The rates selected for the proposed withdrawal assumption have been determined based on years of service, in contrast to the current rates, which are based on age. The current and proposed withdrawal rate tables are provided in Appendix A – Table 4.

Active Mortality

To be consistent with the healthy retiree mortality rates, we propose to change the active mortality assumption to the RP 2000 mortality table for males and females, with male ages set forward 3 years, and female ages set forward 1 year.

A comparison of actual experience with withdrawal/mortality expected under the proposed assumption is shown below. The expected mortality is based on the proposed assumption shown in Appendix A – Table 1.

	<i>Male Active Members</i>	<i>Female Active Members</i>	<i>Active Members Total</i>
Actual Withdrawals/Deaths	864	707	1,571
Expected Withdrawals (Proposed Assumption)	437	432	869
Expected Deaths (Proposed Assumption)	48	29	77
Expected Withdrawals/Deaths	485	461	946
Actual/Expected Ratio	178%	153%	166%



**I. Retirement**

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Current Assumption:	50% retire at first eligibility for unreduced retirement 20% of the remaining members retire in each subsequent year 100% of any remaining at age 70 retire immediately
1997-2001 Study:	Reduced assumption (prior assumption was 80% retire at first eligibility, 0% thereafter, and then 100% of those remaining retire at age 60)
Proposed Assumption:	No change

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The Fund provides unreduced retirement benefits at age 60, or upon completion of 25 years of service if earlier, to employees who became members prior to October 1, 1981. The unreduced retirement age was increased to 65 for employees who became members on or after August 22, 1984. The service requirement for unreduced retirement was increased to 30 years for employees who became members on or after October 1, 1981.

In addition, uniformed personnel who became members prior to October 1, 1981 are eligible for unreduced benefits at age 55 if they have completed 10 years of service. Uniformed personnel who became members on or after October 1, 1981 are eligible for unreduced benefits at age 55 if they have completed 15 years of service. Uniformed personnel who became members on or after August 22, 1984 are eligible for unreduced benefits at age 60 if they have completed 15 years of service.

The following summarizes total retirement experience for active members under age 70 who are eligible to receive unreduced retirement benefits from the Fund.

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	<i>Retired at or before Initial Year of Unreduced Retirement Eligibility</i>	<i>Retired Subsequent to Initial Unreduced Retirement Eligibility</i>
Eligible Members	1,175	2,874
Actual Retirements	230	369
Percentage Retired	20%	13%

---

**Recommendation**

Actual retirement experience over the prior 5 years has been lower the current 50%/20% assumption. However, retirement patterns are greatly affected by economic cycles, which can vary over time. The current assumption was adopted only 5 years ago using data from the prior experience study. We recommend no change to the current assumption at this time.

**J. Refund of Contributions**

Current Assumption:	All members who separate from service with less than 20 years of service elect a refund of contributions
1997-2001 Study:	This assumption was not reviewed
Proposed Assumption:	No change

The Fund requires active members to contribute 9½% of base pay. Members who separate from service may elect to receive a refund of contributions, provided that they have not completed more than 20 years of service with the Fund. Members who receive a refund of contributions are not entitled to further benefits from the Fund unless they are later rehired and repay the contributions that were refunded.

The current assumption is that all members who separate from service with less than 20 years of service elect a refund of contributions. This assumption was not reviewed in the prior experience study.

In order to estimate the proportion of active members with less than 20 years of service who elect a refund of contributions, we have reviewed the combined withdrawal/mortality experience for those members, and subtracted the expected deaths from this experience to estimate the withdrawal experience. Since removal of a member record from the data indicates either a refund of contributions or death, we have inferred the percentage of withdrawing members receiving a refund of contributions from the percent removed from the database. The following summarizes withdrawal experience over the study period for active members with less than 20 years of service.

Actual Withdrawals/Deaths	1,275
Expected Deaths (Proposed Assumption)	56
Net Withdrawals	1,219
Withdrawals/Deaths Removed from Data	945
Expected Deaths (Proposed Assumption)	56
Net Withdrawals Removed from Data	889
Percentage of Withdrawals Removed from Data	73%

**Recommendation**

It is possible that some of the employees who withdrew during the study period and who did not receive a refund of contributions may still elect to receive a refund prior to retirement. The percentage of withdrawals with less than 20 years of service who elect to receive a refund may ultimately rise to 80% or 90% or more. Therefore, we propose no change to the current assumption.

**K. Marital Status**

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Current Assumption: 65% of active members will be married at retirement

1997-2001 Study: This assumption was not reviewed

Proposed Assumption: 75% of active members will be married at retirement

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Actual marital status is provided in the data for retired members. The following summarizes marital status for active members who retired during the study period, including disabled retirees.

Retirements – Married	530
Retirements – Unmarried	177
Total Retirements (Including Disability)	<hr/> 707
Percentage of Married Retirements	75%

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**Recommendation**

Based on the actual experience, we recommend a revised assumption that 75% of active members are married at retirement.



### L. Actuarial Cost Method

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Current Method:	Entry Age Normal
1997-2001 Study:	The actuarial cost method was not reviewed
Proposed Method:	No change

---

An actuarial cost method is used to calculate the plan's accrued liability and normal cost for active members. The most common actuarial cost methods are:

- Unit Credit – This method defines the accrued liability to be the present value of benefits accrued to date. The normal cost is the cost of benefits earned in the current year. This method is not appropriate for plans that base retirement benefits on salary, because this method does not consider the impact of future salary increases. Salary increases and aging can lead to rapidly accelerating normal costs.
- Projected Unit Credit – This method is similar to the Unit Credit method, but future salary increases are factored into the calculation of accrued liability and normal cost.
- Entry Age Normal – This method projects a member's retirement benefit to the expected retirement age and then assigns a cost to each year of service such that the resulting normal costs are level throughout the member's working career, either as a level dollar amount or as a level percentage of pay.

The most common method for public plans is the Entry Age Method. This is generally the most conservative of the methods because it assigns a higher proportion of projected benefits to the accrued liability.

### Recommendation

We recommend that the Fund continue to use the Entry Age Method.

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### M. Asset Valuation Method

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Current Method:	Market value, plus amortized cost of bonds
1997-2001 Study:	The asset valuation method was not reviewed
Proposed Method:	5-year smoothing of unexpected gains and losses

---

An asset valuation method determines the value of the fund assets to be reflected in the actuarial valuation. The most common asset valuation methods are:

- Market Value – This is the simplest method. The asset value is the market value of the fund’s assets. This provides the most up to date funding status, but the unfunded accrued liability and employer contribution rates may be volatile from year to year.
- Amortized Cost – This is useful for funds that hold fixed income securities to maturity. By using the amortized cost of bonds, rather than the market value, the value of the fund’s assets will be more stable over time. However, most funds no longer hold fixed income securities to maturity. This method may still be useful for funds with dedicated bond portfolios.
- “X” year Smoothing Method – This method smoothes investment returns that differ from the actuarial assumption over a period of years that usually range from 3 to 10 years, with 5 years the most common. The general idea is to average investment gains and losses over typical economic cycles so that excess investment returns that occur during “bull markets” can be deferred to help offset investment losses during “bear markets.”

### Recommendation

The current method which reflects the amortized cost of bonds has not produced actuarial value of assets that differs very much from market value. The actuarial values of assets using this method were 100.0% and 100.3% of market values, as of September 30, 2006, and September 30, 2007, respectively. The continued use of this method, coupled with volatile investment returns, will likely result in fluctuating unfunded accrued liabilities and may result in large swings in the required employer contribution.

We propose changing the asset valuation method to one in which unexpected gains and losses (i.e., investment returns that differ from the actuarial interest rate), will be smoothed over a 5 year period. The table below shows the estimated effect on the actuarial value of assets as of September 30, 2008, assuming -4%, 0%, or 7% investment returns for the 2007-08 fiscal year.

GOVERNMENT OF GUAM RETIREMENT FUND ACTUARIAL EXPERIENCE STUDY  
SECTION IV. ACTUARIAL METHODS

2002-2007

	<i>Estimated as of 9/30/2008</i>		
	<i>Assuming 2007/08 Investment Return of</i>		
	<i>-4%</i>	<i>0%</i>	<i>7%</i>
Market value of assets	\$ 1,316,330,000	\$ 1,372,180,000	\$ 1,469,970,000
5-year smoothing of unexpected (gains)/losses	<u>47,250,000</u>	<u>2,570,000</u>	<u>(75,670,000)</u>
Actuarial value of assets	\$ 1,363,580,000	\$ 1,374,750,000	\$ 1,394,300,000
Actuarial value as % of market value	103.6%	100.2%	94.9%

<i>Fiscal Year</i>	<i>Expected Return</i>	<i>Actual Return</i>	<i>Unexpected Gain / (Loss)</i>	<i>Excluded from Actuarial Value</i>	
				<i>%</i>	<i>Amount</i>
<i>Assuming -4% Return for 2007-08</i>					
2007-08 (estimated)	\$ 97,795,262	\$(55,846,064)	\$(153,641,326)	80%	\$ 122,913,061
2006-07	96,793,586	203,048,537	106,254,951	60%	(63,752,971)
2005-06	91,161,120	103,569,442	12,408,322	40%	(4,963,329)
2004-05	88,550,313	123,298,663	34,748,350	20%	(6,949,670)
2003-04	86,586,955	113,037,967	26,451,012	0%	<u>0</u>
				Total	\$ 47,247,091
<i>Assuming 0% Return for 2007-08</i>					
2007-08 (estimated)	\$ 97,795,262	\$ 0	\$(97,795,262)	80%	\$ 78,236,210
2006-07	96,793,586	203,048,537	106,254,951	60%	(63,752,971)
2005-06	91,161,120	103,569,442	12,408,322	40%	(4,963,329)
2004-05	88,550,313	123,298,663	34,748,350	20%	(6,949,670)
2003-04	86,586,955	113,037,967	26,451,012	0%	<u>0</u>
				Total	\$ 2,570,240
<i>Assuming 7% Return for 2007-08</i>					
2007-08 (estimated)	\$ 97,795,262	\$ 97,795,262	\$ 0	80%	\$ 0
2006-07	96,793,586	203,048,537	106,254,951	60%	(63,752,971)
2005-06	91,161,120	103,569,442	12,408,322	40%	(4,963,329)
2004-05	88,550,313	123,298,663	34,748,350	20%	(6,949,670)
2003-04	86,586,955	113,037,967	26,451,012	0%	<u>0</u>
				Total	\$ (75,665,970)

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**Appendix A. Summary of Current/Proposed Assumptions**

	<u>Current Assumption</u>		<u>Proposed Assumption</u>
<b>Interest Rate</b>	7.00%		Same
<b>Salary Increases</b>	<u>Service</u>	<u>% Increase</u>	Same
	0 – 5	8.5%	
	6 – 10	7.0%	
	11 – 15	6.0%	
	16 – 20	5.0%	
	Over 20	4.0%	
<b>Total Payroll Growth</b>	3.50%		3.00%
<b>Retiree Mortality</b> Healthy lives (Table 1)	1994 U.S. Uninsured Pensioners +2 for males +0 for females		RP-2000 Healthy table +3 for males +1 for females
<b>Active Mortality</b> (Table 1)	1994 U.S. Uninsured Pensioners +2 for males +0 for females		RP-2000 Healthy table +3 for males +1 for females
<b>Disability</b> Incidence (Table 3)	1974-78 SOA LTD Non-Jumbo with rates increased for males by 30%		1974-78 SOA LTD Non-Jumbo (no increase to male rates)
Post-disability mortality (Table 2)	1984 U.S. Uninsured Pensioners +10 for males +8 for females		RP 2000 Disability table
<b>Withdrawal Rates</b> (Table 4)	Age-based rates from 1997-2001 experience study		Service-based rates from 2002-2007 experience study
<b>Retirement Age</b>	50% assumed to retire at earliest eligibility for unreduced benefits.		Same
	20% per year thereafter until age 70		
	100% at age 70		

	<u><i>Current Assumption</i></u>	<u><i>Proposed Assumption</i></u>
<b>Return of Contributions</b>	<p>100% of those who withdraw before retirement and who have less than 20 years of service are assumed to elect a return of contributions</p> <p>All employees who have previously withdrawn are assumed to elect a return of contributions.</p> <p>Contributions earn 4.5% interest</p>	Same
<b>Marital Status</b>	Retiree data include spouse information. For active employees, 65% are assumed to have spouses at retirement.	Retiree data include spouse information. For active employees, 75% are assumed to have spouses at retirement.
<b>Sick Leave Adjustments</b>	Assumed to add 1.5 years of service and increase average earnings by 10% at retirement	Same
<b>Administrative Expenses</b>	Equal to administrative expenses in prior year	Same
<b>Actuarial Cost Method</b>	Entry Age Normal	Same
<b>Asset Valuation Method</b>	Market, except fixed income investments at amortized cost	5-Year Smoothing Method

**Table 1. Healthy Mortality Rate Assumption**

**Probabilities of Death for Healthy Active/Retired Members**  
(per 100 at each age)

<i>Current Assumption</i>			<i>Proposed Assumption</i>		
<u>Age</u>	<u>Male</u>	<u>Female</u>	<u>Age</u>	<u>Male</u>	<u>Female</u>
20	0.06	0.03	20	0.04	0.02
21	0.06	0.03	21	0.04	0.02
22	0.07	0.03	22	0.04	0.02
23	0.07	0.03	23	0.04	0.02
24	0.07	0.03	24	0.04	0.02
25	0.08	0.03	25	0.04	0.02
26	0.08	0.03	26	0.04	0.02
27	0.08	0.03	27	0.04	0.02
28	0.09	0.03	28	0.05	0.02
29	0.09	0.04	29	0.06	0.03
30	0.09	0.04	30	0.06	0.03
31	0.09	0.04	31	0.07	0.04
32	0.09	0.04	32	0.08	0.04
33	0.09	0.05	33	0.08	0.04
34	0.09	0.05	34	0.09	0.05
35	0.10	0.05	35	0.10	0.05
36	0.10	0.06	36	0.10	0.06
37	0.11	0.06	37	0.11	0.06
38	0.12	0.06	38	0.11	0.06
39	0.12	0.07	39	0.12	0.07
40	0.13	0.08	40	0.13	0.08
41	0.15	0.08	41	0.14	0.09
42	0.16	0.09	42	0.15	0.09
43	0.17	0.09	43	0.16	0.10
44	0.19	0.10	44	0.17	0.11
45	0.20	0.10	45	0.19	0.12
46	0.23	0.11	46	0.20	0.13
47	0.25	0.12	47	0.21	0.14
48	0.28	0.13	48	0.24	0.16
49	0.31	0.14	49	0.27	0.17
50	0.35	0.15	50	0.29	0.19
51	0.39	0.17	51	0.32	0.20
52	0.43	0.19	52	0.36	0.22
53	0.48	0.21	53	0.42	0.24
54	0.53	0.22	54	0.47	0.27
55	0.60	0.25	55	0.53	0.31
56	0.68	0.28	56	0.59	0.35
57	0.76	0.31	57	0.67	0.39
58	0.86	0.36	58	0.77	0.44
59	0.97	0.42	59	0.88	0.51
60	1.09	0.48	60	1.00	0.58
61	1.23	0.55	61	1.13	0.67
62	1.39	0.63	62	1.27	0.76
63	1.56	0.72	63	1.44	0.86
64	1.75	0.82	64	1.61	0.97

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**Probabilities of Death for Healthy Active/Retired Members**  
(per 100 at each age)

<i>Current Assumption</i>			<i>Proposed Assumption</i>		
<u>Age</u>	<u>Male</u>	<u>Female</u>	<u>Age</u>	<u>Male</u>	<u>Female</u>
65	1.94	0.93	65	1.79	1.10
66	2.14	1.04	66	1.98	1.22
67	2.34	1.16	67	2.22	1.34
68	2.55	1.26	68	2.46	1.49
69	2.79	1.37	69	2.73	1.67
70	3.06	1.48	70	3.04	1.86
71	3.35	1.61	71	3.39	2.07
72	3.66	1.77	72	3.78	2.30
73	4.00	1.97	73	4.22	2.55
74	4.39	2.19	74	4.69	2.81
75	4.86	2.44	75	5.21	3.10
76	5.40	2.72	76	5.79	3.41
77	6.01	3.05	77	6.44	3.76
78	6.67	3.41	78	7.20	4.15
79	7.38	3.80	79	8.05	4.59
80	8.12	4.24	80	8.97	5.08
81	8.87	4.73	81	9.98	5.63
82	9.64	5.29	82	11.08	6.25
83	10.46	5.90	83	12.28	6.95
84	11.38	6.56	84	13.60	7.74
85	12.44	7.28	85	15.06	8.64
86	13.65	8.10	86	16.64	9.63
87	14.99	9.03	87	18.34	10.73
88	16.44	10.09	88	19.98	11.92
89	17.98	11.25	89	21.66	13.17
90	19.60	12.50	90	23.37	14.46
91	21.33	13.84	91	25.07	15.76
92	23.19	15.27	92	26.75	17.04
93	25.12	16.77	93	28.39	18.28
94	27.04	18.35	94	29.99	19.45
95	28.90	20.02	95	31.53	20.54
96	30.68	21.78	96	33.02	21.52
97	32.40	23.62	97	34.46	22.39
98	34.11	25.56	98	35.86	23.14
99	35.86	27.60	99	37.17	23.75

**Table 2. Disabled Mortality Rate Assumption**

<b><u>Probabilities of Death for Disabled Retired Members</u></b>					
<b>(per 100 at each age)</b>					
<b><i>Current Assumption</i></b>			<b><i>Proposed Assumption</i></b>		
<b><u>Age</u></b>	<b><u>Male</u></b>	<b><u>Female</u></b>	<b><u>Age</u></b>	<b><u>Male</u></b>	<b><u>Female</u></b>
20	0.11	0.11	20	2.26	0.75
21	0.11	0.11	21	2.26	0.75
22	0.12	0.11	22	2.26	0.75
23	0.12	0.11	23	2.26	0.75
24	0.13	0.12	24	2.26	0.75
25	0.14	0.12	25	2.26	0.75
26	0.15	0.13	26	2.26	0.75
27	0.16	0.14	27	2.26	0.75
28	0.18	0.15	28	2.26	0.75
29	0.19	0.16	29	2.26	0.75
30	0.21	0.18	30	2.26	0.75
31	0.23	0.19	31	2.26	0.75
32	0.26	0.21	32	2.26	0.75
33	0.28	0.23	33	2.26	0.75
34	0.31	0.26	34	2.26	0.75
35	0.34	0.28	35	2.26	0.75
36	0.38	0.31	36	2.26	0.75
37	0.42	0.34	37	2.26	0.75
38	0.46	0.38	38	2.26	0.75
39	0.51	0.42	39	2.26	0.75
40	0.56	0.46	40	2.26	0.75
41	0.62	0.51	41	2.26	0.75
42	0.69	0.56	42	2.26	0.75
43	0.75	0.62	43	2.26	0.75
44	0.83	0.69	44	2.26	0.75
45	0.90	0.75	45	2.26	0.75
46	0.99	0.83	46	2.38	0.82
47	1.08	0.90	47	2.51	0.90
48	1.19	0.99	48	2.64	0.98
49	1.30	1.08	49	2.77	1.06
50	1.42	1.19	50	2.90	1.15
51	1.55	1.30	51	3.03	1.25
52	1.70	1.42	52	3.16	1.35
53	1.87	1.55	53	3.29	1.45
54	2.05	1.70	54	3.42	1.55
55	2.26	1.87	55	3.54	1.65
56	2.48	2.05	56	3.67	1.76
57	2.72	2.26	57	3.80	1.87
58	2.96	2.48	58	3.93	1.97
59	3.21	2.72	59	4.07	2.08
60	3.47	2.96	60	4.20	2.18
61	3.77	3.21	61	4.35	2.29
62	4.09	3.47	62	4.50	2.41
63	4.45	3.77	63	4.66	2.53
64	4.85	4.09	64	4.83	2.66

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**Probabilities of Death for Disabled Retired Members**

(per 100 at each age)

<i>Current Assumption</i>			<i>Proposed Assumption</i>		
<u>Age</u>	<u>Male</u>	<u>Female</u>	<u>Age</u>	<u>Male</u>	<u>Female</u>
65	5.29	4.45	65	5.02	2.80
66	5.78	4.85	66	5.22	2.96
67	6.31	5.29	67	5.44	3.13
68	6.86	5.78	68	5.69	3.32
69	7.46	6.31	69	5.96	3.53
70	8.13	6.86	70	6.26	3.76
71	8.85	7.46	71	6.58	4.01
72	9.62	8.13	72	6.94	4.29
73	10.43	8.85	73	7.33	4.58
74	11.28	9.62	74	7.75	4.89
75	12.21	10.43	75	8.21	5.22
76	13.22	11.28	76	8.70	5.58
77	14.32	12.21	77	9.21	5.95
78	15.51	13.22	78	9.76	6.35
79	16.82	14.32	79	10.34	6.78
80	18.25	15.51	80	10.94	7.23
81	19.80	16.82	81	11.55	7.71
82	21.50	18.25	82	12.19	8.23
83	23.30	19.80	83	12.83	8.78
84	25.25	21.50	84	13.49	9.38
85	27.39	23.30	85	14.16	10.02
86	29.72	25.25	86	14.84	10.71
87	32.26	27.39	87	15.52	11.45
88	34.95	29.72	88	16.22	12.25
89	37.89	32.26	89	16.92	13.10
90	41.09	34.95	90	18.34	14.00
91	44.58	37.89	91	19.98	14.97
92	48.38	41.09	92	21.66	15.99
93	52.43	44.58	93	23.37	17.04
94	56.84	48.38	94	25.07	18.28
95	61.64	52.43	95	26.75	19.45
96	66.87	56.84	96	28.39	20.54
97	72.57	61.64	97	29.99	21.52
98	78.65	66.87	98	31.53	22.39
99	85.27	72.57	99	33.02	23.14

**Table 3. Disability Incidence Rate Assumption**

<b>Probabilities of Disability for Active Members</b>					
(per 100 working at each age)					
<i>Current Assumption</i>			<i>Proposed Assumption</i>		
<u>Age</u>	<u>Male</u>	<u>Female</u>	<u>Age</u>	<u>Male</u>	<u>Female</u>
20	0.13	0.10	20	0.10	0.10
21	0.13	0.10	21	0.10	0.10
22	0.13	0.10	22	0.10	0.10
23	0.13	0.10	23	0.10	0.10
24	0.13	0.10	24	0.10	0.10
25	0.13	0.10	25	0.10	0.10
26	0.13	0.10	26	0.10	0.10
27	0.13	0.10	27	0.10	0.10
28	0.13	0.10	28	0.10	0.10
29	0.13	0.10	29	0.10	0.10
30	0.13	0.10	30	0.10	0.10
31	0.13	0.10	31	0.10	0.10
32	0.13	0.10	32	0.10	0.10
33	0.13	0.10	33	0.10	0.10
34	0.13	0.10	34	0.10	0.10
35	0.13	0.10	35	0.10	0.10
36	0.13	0.10	36	0.10	0.10
37	0.13	0.10	37	0.10	0.10
38	0.13	0.10	38	0.10	0.10
39	0.13	0.10	39	0.10	0.10
40	0.26	0.20	40	0.20	0.20
41	0.26	0.20	41	0.20	0.20
42	0.26	0.20	42	0.20	0.20
43	0.26	0.20	43	0.20	0.20
44	0.26	0.20	44	0.20	0.20
45	0.47	0.36	45	0.36	0.36
46	0.47	0.36	46	0.36	0.36
47	0.47	0.36	47	0.36	0.36
48	0.47	0.36	48	0.36	0.36
49	0.47	0.36	49	0.36	0.36
50	0.82	0.63	50	0.63	0.63
51	0.82	0.63	51	0.63	0.63
52	0.82	0.63	52	0.63	0.63
53	0.82	0.63	53	0.63	0.63
54	0.82	0.63	54	0.63	0.63
55	1.38	1.06	55	1.06	1.06
56	1.38	1.06	56	1.06	1.06
57	1.38	1.06	57	1.06	1.06
58	1.38	1.06	58	1.06	1.06
59	1.38	1.06	59	1.06	1.06
60	1.96	1.51	60	1.51	1.51
61	1.96	1.51	61	1.51	1.51
62	1.96	1.51	62	1.51	1.51
63	1.96	1.51	63	1.51	1.51
64	1.96	1.51	64	1.51	1.51

*This work product was prepared solely for the plan sponsor for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work.*

**Table 4. Withdrawal Rate Assumption**

<b><u>Probability of Withdrawal from Active Service</u></b> (per 100 working at each age/service duration)					
<i>Current Assumption</i>			<i>Proposed Assumption</i>		
<u>Age</u>	<u>Male</u>	<u>Female</u>	<u>Service</u>	<u>Male</u>	<u>Female</u>
20	7.31	9.67	0	15.0	15.0
21	6.99	9.36	1	14.0	14.0
22	6.71	9.01	2	13.0	13.0
23	6.41	8.66	3	12.0	12.0
24	6.19	8.32	4	11.0	11.0
25	5.99	7.97	5	10.0	10.0
26	5.78	7.61	6	9.0	9.0
27	5.59	7.31	7	8.0	8.0
28	5.42	7.04	8	7.0	7.0
29	5.26	6.80	9	6.0	6.0
30	5.12	6.58	10	5.0	5.0
31	4.97	6.37	11	4.5	4.5
32	4.83	6.16	12	4.0	4.0
33	4.69	5.96	13	3.5	3.5
34	4.54	5.78	14	3.0	3.0
35	4.39	5.60	15	2.5	2.5
36	4.22	5.43	16	2.0	2.0
37	4.04	5.27	17	2.0	2.0
38	3.86	5.11	18	2.0	2.0
39	3.67	4.95	19	2.0	2.0
40	3.48	4.80	20 &	2.0	2.0
41	3.36	4.65	over		
42	3.29	4.57			
43	3.23	4.36			
44	3.18	4.22			
45	3.13	4.07			
46	2.99	3.92			
47	2.80	3.75			
48	2.59	3.56			
49	2.36	3.25			
50	2.11	2.87			
51	1.76	2.44			
52	1.36	2.02			
53	0.95	1.63			
54	0.64	1.32			
55	0.42	1.08			
56	0.00	0.00			
57	0.00	0.00			
58	0.00	0.00			
59	0.00	0.00			
60	0.00	0.00			
61	0.00	0.00			
62	0.00	0.00			
63	0.00	0.00			
64	0.00	0.00			

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## Appendix B. Glossary of Key Terms

**Accrued Liability.** The Present Value of Future Benefits allocated to past service in accordance with the actuarial cost method.

**Actuarial Cost Method.** A method of allocating the present value of benefits to past and future periods. Actuarial cost methods take into consideration the effect of wage inflation.

**Actuarial Gains and Losses.** Changes to the Accrued Liability due to deviations from the actuarial assumptions. These can include gains and losses from investments, employee turnover, disability, retirement, mortality, and administrative expenses.

**Actuarial Value of Assets.** A method of valuing Fund assets that smoothes gains and losses that occur in the market value.

**ASOP.** Any one of several Actuarial Standards of Practice that are developed by the Actuarial Standards Board and the American Academy of Actuaries.

**GASB.** Government Accounting Standards Board. GASB No. 25 and No. 27 are accounting standards issued by GASB that require certain items be disclosed in the Fund's financial statements.

**Normal Cost.** The value of benefits earned for one year of service. The normal cost is calculated in accordance with the actuarial cost method. The accumulation of all normal costs assigned to past service equals the Accrued Liability.

**Present Value of Benefits.** The sum of all benefits expected to be paid in the future by the retirement system, with the payments discounted to the present using the valuation interest rate. This includes benefits to be earned in the future for current employees.

**Present Value of Future Normal Cost.** The sum of all future normal costs expected for current employees, with the costs discounted back to the present using the valuation interest rate.

**Security Ratio.** The percentage of the Accrued Liability that is funded by the Fund assets. A fully funded plan will have a security ratio of 100%.

**Unfunded Accrued Liability.** The dollar value of the Accrued Liability that exceeds the value of the Fund assets. A fully funded plan will have no unfunded accrued liability.