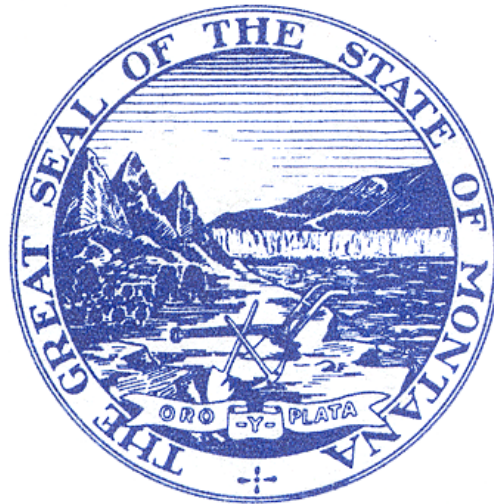


**Montana University System  
Participation in the  
Teachers' Retirement System**

**ACTUARIAL VALUATION  
(As of July 1, 2004)**



Prepared by:

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November 3, 2004

Teachers' Retirement Board  
State of Montana  
1500 Sixth Avenue  
Helena, Montana 59620-0139

Dear Members of the Board:

At your request, we have completed the actuarial valuation of the Montana University System (MUS) members' participation in the Teachers' Retirement System of the State of Montana as of July 1, 2004. The results of the valuation are contained in the following report; they are summarized in Section 1.

In preparing this report, we relied, without audit, on information (some oral and some in writing) supplied by the System's staff. This information includes, but is not limited to, statutory provisions, employee data, and financial information. In our examination of these data, we have found them to be reasonably consistent and comparable with data used for other purposes. It should be noted that if any data or other information is inaccurate or incomplete, our calculations may need to be revised.

On the basis of the foregoing, we hereby certify that, to the best of our knowledge and belief, this report is complete and accurate and has been prepared in accordance with generally recognized and accepted actuarial principles and practices which are consistent with the principles prescribed by the Actuarial Standards Board (ASB) and the Code of Professional Conduct and Qualification Standards for Public Statements of Actuarial Opinion of the American Academy of Actuaries.

We further certify that all costs, liabilities, rates of interest, and other factors for the System have been determined on the basis of actuarial assumptions and methods which are individually reasonable (taking into account the experience of the System and reasonable expectations); and which, in combination, offer our best estimate of anticipated experience affecting the System. Nevertheless, the emerging costs will vary from those presented in this report to the extent that actual experience differs from that projected by the actuarial assumptions. The Board of Trustees has the final decision regarding the appropriateness of the assumptions and adopted them as indicated in Appendix A.

Actuarial computations presented in this report are for purposes of determining the recommended contributions to amortize the Past Service Liability of the Montana University System. The calculations in the enclosed report have been made on a basis consistent with our understanding of the System's funding requirements and goals. Determinations for purposes other than meeting these requirements may be significantly different from the



results contained in this report. Accordingly, additional determinations may be needed for other purposes. Any distribution of this report must be in its entirety including this cover letter, unless prior written consent from Milliman is obtained.

We would like to express our appreciation to Mr. David L. Senn, Executive Director of the System, and to members of his staff, who gave substantial assistance in supplying the data on which this report is based.

We, Mark C. Olleman and Karen I. Steffen, are members of the American Academy of Actuaries and Fellows of the Society of Actuaries, and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

We respectfully submit the following report, and we look forward to discussing it with you.

Respectfully submitted,

A handwritten signature in black ink that reads "Mark C. Olleman". The signature is written in a cursive style with a long, sweeping tail on the "n".

Mark C. Olleman, F.S.A., M.A.A.A.  
Actuary  
MCO/KIS/nlo

A handwritten signature in black ink that reads "Karen I. Steffen". The signature is written in a cursive style with a prominent vertical stroke at the end.

Karen I. Steffen, F.S.A., M.A.A.A.  
Consulting Actuary

**Montana University System  
Participation in the Teachers' Retirement System**

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**Montana University System  
Participation in the Teachers' Retirement System**

**Section 1**

**Summary of Findings**

We have been asked to perform an actuarial valuation of the Montana University System (MUS) to determine its financial position and determine the supplemental contribution rate necessary to amortize the Past Service Liability of the university system members by July 1, 2033. This valuation is required by MCA, Section 19-21-203. The valuation assumptions are the same as those used in our July 1, 2004 Actuarial Valuation of the Teachers' Retirement System.

In this valuation, we studied the MUS members independently of the non-MUS members to determine the contribution rate needed to independently amortize the Past Service Liability of the MUS members by July 1, 2033. We have projected that the current 4.04% contribution rate made by the Board of Regents needs to be increased as follows starting July 1, 2005 to amortize the Past Service Liability of the MUS members by July 1, 2033. We have calculated the costs both including and excluding the 1.5% GABA passed in 1999 in the Past Service Liability.

Current Contribution Rate	Supplemental Contribution Rate Beginning July 1, 2005 to Amortize Past Service Liability by July 1, 2033	
	1.5% GABA Excluded	1.5% GABA Included
4.04%	5.09%	7.23%

The required supplemental contribution rates determined by future MUS actuarial valuations will depend upon the actual experience of the System. Differences between actual experience and the experience predicted by the actuarial assumptions will have an impact on the funding of the University System's Past Service Liability. Future improvements to the MUS members' benefits will also have an impact on funding.

The effect of changes since the July 1, 2000 MUS valuation can be distributed as follows:

**Impact of changes on the Supplemental Contribution Rate**

July 1, 2000 MUS Valuation Supplemental Rate with GABA	5.62%
Expected Increase (Contribution Rate Below 5.62%)	0.25
New Demographic Assumptions Adopted in July 1, 2002 TRS Valuation	0.03
New Economic Assumptions Adopted in July 1, 2004 TRS Valuation	0.55
Asset Loss	1.10
Liability Gain	<u>(0.32)</u>
July 1, 2004 Supplemental Rate with GABA	7.23%
1.5% GABA excluded	<u>(2.14)</u>
July 1, 2004 Supplemental Rate without GABA	5.09%

The remaining sections of this report describe the methodology and results of this actuarial valuation.



**Montana University System  
Participation in the Teachers' Retirement System**

**Section 2**

**Scope of the Report**

This actuarial valuation is performed in compliance with Section 19-20-621 of MCA, which reads as follows:

“Montana university system optional retirement program supplemental contributions.

- (1) Each employer within the university system with employees participating in the optional retirement program under Title 19, chapter 21, shall contribute to the teachers' retirement system a supplemental employer contribution sufficient to amortize, by July 1, 2033, the Past Service Liability of the teachers' retirement system for the university system members.
- (2) The optional retirement program supplemental employer contribution as a percentage of the total compensation of all employees participating in the program must increase to:
  - (a) 2.81% beginning July 1, 1997;
  - (b) 3.12% beginning July 1, 1998;
  - (c) 3.42% beginning July 1, 1999;
  - (d) 3.73% beginning July 1, 2000; and
  - (e) 4.04% beginning July 1, 2001.
- (3) The board shall periodically review the supplemental employer contribution rate and recommend adjustments to the legislature as needed to maintain the amortization of the university system's Past Service Liability by July 1, 2033.”

This legislation was the result of the creation of the Optional Retirement Program (ORP) for employees of the Montana University System (MUS), which was established January 1, 1988. Subsequent to the establishment of ORP, MUS employees could elect to join ORP or TRS. To prevent an adverse impact on TRS, a supplemental contribution rate of 4.503% of earned compensation of MUS employees who participated in ORP was contributed to TRS. Legislation in 1993 removed the MUS election and required all new MUS employees hired after July 1, 1993 to join ORP. The supplemental contribution rate has been reset twice. It was first reset to 2.503%. It was most recently reset to the schedule shown above in MCA 19-20-621, which was based on the July 1, 1996 MUS valuation.

This report presents the actuarial valuation of the MUS members in the Teachers' Retirement System as of July 1, 2004.



A summary of the findings resulting from this valuation is presented in the previous section. Section 3 describes the assets of the System; Sections 4 and 5 describe how the obligations of the System are to be met under the actuarial cost method in use.

The actuarial procedures and assumptions used in this valuation are described in Appendix A.

The current benefit structure, as determined by the provisions of the governing law on July 1, 2004, is summarized in Appendix B. Schedules of valuation data classifying the data used in the valuation by category (contributing members, former contributing members, and beneficiaries) make up Appendix C. Appendix D is a glossary of actuarial terms used in this report.



**Montana University System  
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**Section 3**

**Assets**

In many respects, an actuarial valuation can be regarded as an inventory process. The inventory is taken as of the actuarial valuation date, which for this valuation is July 1, 2004. On that date the assets available for the payment of benefits are appraised. These assets are compared with the actuarial liabilities. The actuarial process thus leads to a method of determining what contributions by members and their employers are needed to strike a balance.

The asset valuation method was adopted beginning with the July 1, 2000 valuation. The expected return is determined each year based on the beginning of year market value and actual cash flows during the year. Any difference between the expected market value return and the actual market value return is recognized evenly over a period of five years.

Table 1 summarizes the actuarial value of the net assets available for benefits on July 1, 2004. The values have been separated into MUS and non-MUS based on additional financial data reported to us by TRS, which were accepted without audit. The determination of the MUS assets on the actuarial basis is based on the ratio of the market value of the MUS assets to the market value of the total TRS assets reported to us. The market value of the MUS assets was reported to us both with and without past GABA benefits being subtracted out. We used these two market values to derive the two different actuarial values shown in Table 1.



**Montana University System  
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**Table 1**

**Determination of Actuarial Value of Assets  
July 1, 2004**

**Determination of Recognized Investment Gains and Losses - Five-Year Smoothing**

A. Expected investment return – Year Ended 6/30/2004	\$	167,963,268
B. Actual investment return – Year Ended 6/30/2004	\$	279,396,768
C. Gains/(losses) – 2004 [B – A]	\$	111,433,500
D. Gains/(losses) – 2003	\$	(37,239,499)
E. Gains/(losses) – 2002	\$	(338,875,181)
F. Gains/(losses) – 2001	\$	(310,524,198)
G. Gains/(losses) – 2000	\$	(3,684,142)
H. Gains/(losses) recognized at July 1, 2004 [1/5 C + 1/5 D + 1/5 E + 1/5 F + 1/5 G]	\$	(115,777,904)

**Determination of Actuarial Assets**

Actuarial value of assets July 1, 2003	\$	2,481,697,476
Contributions less benefits	\$	(48,186,830)
Expected investment return		167,963,268
Recognized investment gains/(losses)	<u>(115,777,904)</u>	<u>3,998,534</u>

**Actuarial value of assets July 1, 2004**

Unrecognized Loss	<u>(130,851,811)</u>
Market Value of Assets July 1, 2004 (Actuarial Value + Unrecognized Gain)	\$ 2,354,844,199

**GABA Benefits Allocated to MUS Assets**

	<u>MUS</u>	<u>Non-MUS</u>
July 1, 2004 Market Value of Assets	\$ 252,008,289	\$ 2,102,835,910
July 1, 2004 Actuarial Value of Assets	\$ 266,011,653	\$ 2,219,684,357

**GABA Benefits Not Allocated to MUS Assets**

	<u>MUS</u>	<u>Non-MUS</u>
July 1, 2004 Market Value of Assets	\$ 255,862,623	\$ 2,098,981,576
July 1, 2004 Actuarial Value of Assets	\$ 270,080,161	\$ 2,215,615,849

*Note: The actuarial value of assets is equal to the expected value plus a five-year smoothing of market value gains and losses.*



**Montana University System  
Participation in the Teachers' Retirement System**

**Section 4**

**Actuarial Present Value of Future Benefits**

In the previous section, an actuarial valuation was related to an inventory process and an analysis was given of the inventory of assets of the System as of the valuation date, July 1, 2004. In this section, the discussion will focus on the commitments of the System, which will be referred to as the actuarial present value of future benefits.

Table 2 contains an analysis of the actuarial present value of all future benefits for contributing members, for former contributing members, and for beneficiaries. The analysis is shown separately for MUS and non-MUS members. The total liabilities shown equal those shown in the regular July 1, 2004 TRS actuarial valuation report. The footnote provides the actuarial present value of all future benefits for the MUS members if the 1.5% GABA is excluded.

The actuarial liabilities summarized in Table 2 include the actuarial present value of all future benefits expected to be paid with respect to each member. For an active member, this value includes a measure of both benefits already earned and future benefits to be earned. Thus, for all members, active and retired, the value extends over benefits earnable and payable for the rest of their lives and, if an optional benefit is chosen, for the lives of their surviving beneficiaries.

**Montana University System  
Participation in the Teachers' Retirement System**

**Table 2**

**Actuarial Present Value of Future Benefits  
for Contributing Members, Former Contributing  
Members, and Beneficiaries**

**July 1, 2004**

**(All amounts are actuarial present values in millions)**

	MUS	Non-MUS	Total
<b>A. Active members</b>			
Service retirement	194.2	1,619.1	1,813.3
Disability retirement	1.0	20.5	21.5
Survivors' benefits	6.6	36.1	42.7
Vested retirement	0.6	30.9	31.5
Refund of member contributions	0.4	31.3	31.7
<b>Total</b>	<b>\$ 202.8</b>	<b>\$ 1,737.9</b>	<b>\$ 1,940.7</b>
<b>B. Inactive members and annuitants</b>			
Service retirement	272.8	1,402.3	1,675.1
Disability retirement	1.1	16.0	17.1
Beneficiaries*	23.9	83.3	107.2
Vested terminated members	8.1	46.5	54.6
Nonvested terminated members	0.6	10.7	11.3
<b>Total</b>	<b>\$ 306.5</b>	<b>\$ 1,558.8</b>	<b>\$ 1,865.3</b>
<b>C. Grand total**</b>	<b>\$ 509.3</b>	<b>\$ 3,296.7</b>	<b>\$ 3,806.0</b>

\* Includes survivors of active and retired members, and children's benefits.

\*\* The Grand total Actuarial Present Value of Future Benefits for MUS members without GABA is \$454,600,000.



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**Montana University System  
Participation in the Teachers' Retirement System**

**Section 5**

**Employer Contributions**

In the previous two sections, attention has been focused on the assets and actuarial liabilities of the System. A comparison of Tables 1 and 2 indicates that there is a shortfall in current assets to meet the total present value of future benefits, both for TRS in total and for the assets and liabilities attributable to the MUS members. This is the universal experience in all but a fully closed-down fund where no further contributions of any sort are anticipated.

In a defined benefit plan, there will always be a difference between the actuarial liabilities and the assets. This difference has to be funded with future contributions and investment returns. An actuarial valuation sets a schedule of future contributions that will deal with this funding in an orderly fashion.

The method used to determine the incidence of the contributions in various years is called the actuarial cost method. For the MUS valuation, the funding of the MUS benefits was based on a derivation of an aggregate cost method. The excess of the Actuarial Present Value of Future Benefits of the MUS members over the Actuarial Value of Assets and Present Value of Future Contributions made by the MUS members and their employers is allocated as a level percent of the salaries of members in the ORP between the valuation date and July 1, 2033.

Table 3 shows how the Past Service Liability was derived for the MUS members. Lines A and B show, respectively, the total present value of future benefits and the portion of the total liability that is expected to be paid to TRS from future contributions, both employer and employee, based on the current contribution rates. Line C shows the assets available for benefits. Line D shows the remaining Past Service Liability yet to be funded by additional supplemental contributions.

Table 3 shows the derivation of the percentage of future ORP salaries required to fund the remaining Past Service Liability for the MUS members. The MUS Past Service Liability from Line D is adjusted for anticipated contributions and interest during the fiscal year ending June 30, 2005 on Lines E and F to provide an estimated MUS Past Service Liability of \$213.8 million as of June 30, 2005. Line I shows that a contribution rate of 7.23% of ORP salaries commencing July 1, 2005 would be necessary to amortize the Past Service Liability for all MUS benefits, including GABA, by June 30, 2033. If the cost of funding GABA for the MUS members is not included in the past service liability, then the supplemental contribution rate would be 5.09%.

The Past Service Liability at any date after establishment of a system is affected by any actuarial gains or losses arising when the actual experience of the system varies from the experience anticipated by the actuarial assumptions used in the valuations. To the extent actual experience as it develops differs from the assumptions used, so also will the actual emerging costs differ from the estimated costs.



**Montana University System  
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**Table 3**

**Recommended Supplemental Contribution Rate  
As a Percentage of Salary  
(All Dollar Amounts in Millions)**

	Including GABA		Excluding GABA
	July 1, 2004 MUS Only	July 1, 2000 MUS Only	July 1, 2004 MUS Only
A. Actuarial present value of future benefits for present and former members and their survivors (Table 2)	\$ 509.3	\$ 453.6	\$ 454.6
B. Actuarial present value of total future contributions for present members*	40.1	55.9	40.1
C. Actuarial value of assets available for benefits (Table 1)	<u>266.0</u>	<u>265.0</u>	<u>270.1</u>
D. Remaining Past Service Liability to be paid for by a percentage of future ORP salaries (A - B - C)	\$ 203.2	\$ 132.7	\$ 144.4
E. Interest on Past Service Liability for Fiscal Year ending one year after the valuation date	15.7	10.6	11.2
F. Estimated supplemental payment of 4.04% towards Past Service Liability for Fiscal Year ending one year after the valuation date.	<u>5.1</u>	<u>2.8</u>	<u>5.1</u>
G. Estimated MUS Past Service Liability one year after the valuation date (D + E - F)	\$ 213.8	\$ 140.5	\$ 150.5
H. Present value, one year after the valuation date, of future ORP salaries through June 30, 2033	\$ 2,957.5	\$ 2,500.8	\$ 2,957.5
I. Supplemental contribution rate as a percentage of salaries to fund all MUS Benefits* (G/H)	7.23%	5.62%	5.09%

\* This is based on the current total employer contribution rate of 7.58% and employee contribution rate of 7.15%. In accordance with MCA 19-20-604, the employer contribution rate will be reduced by 0.11% when the amortization period of the Teachers' Retirement System's unfunded actuarial accrued liability is 10 years or less according to the System's latest actuarial valuation.



**Montana University System  
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**Appendix A**

**Actuarial Procedures and Assumptions**

The actuarial assumptions used in this valuation were adopted by the Board for the July 1, 2004 Teachers' Retirement System Actuarial Valuation. The Board adopted new economic assumptions at the May 14, 2004 Retirement Board Meeting. Active demographic assumptions were reviewed in the 2002 Investigation of Experience Study. Retired demographic assumptions were last reviewed in the 2000 Investigation of Experience Study.

Tables A-3 through A-6 give rates of decrement for service retirement, disablement, mortality, and other terminations of employment. These rates of decrement are referred to in actuarial literature as the absolute rate of decrement, or  $q'_x$ . Table A-7 shows the assumed probability of immediate refund of contributions among members terminating with five or more years of service.

**Actuarial Cost Method**

The funding of the MUS benefits was based on a derivation of an aggregate cost method, as required by legislative provisions. The excess of the Actuarial Present Value of Future Benefits of the MUS members over the Actuarial Value of Assets and Present Value of Future Contributions made by the MUS members and their employers is allocated as a level percent of the salaries of members in the ORP between the valuation date and July 1, 2033.

**Records and Data**

The data used in the valuation consist of financial information; records of age, sex, service, salary, contribution rates, and account balances of contributing members; and records of age, sex, and amount of benefit for retired members and beneficiaries. All of the data were supplied by the System and are accepted for valuation purposes without audit.

**Replacement of Terminated Members**

No replacement of MUS members is assumed.

**Employer Contributions**

At the time of this valuation, the TRS employer contribution rate for normal costs and amortization of the unfunded actuarial accrued liability was 7.58% of members' salaries. In accordance with MCA 19-20-604, the employer contribution rate will return to 7.47% when the amortization period of the System's unfunded actuarial accrued liability is 10 years or less according to the System's latest actuarial valuation.



### **Administrative and Investment Expenses**

The administrative and investment expenses of the System are assumed to be funded by investment earnings in excess of 7.75% per year. (Adopted effective July 1, 2004)

### **Valuation of Assets - Actuarial Basis**

The actuarial asset valuation method spreads asset gains and losses over five years. The expected return is determined each year based on the beginning of year market value and actual cash flows during the year. Any difference between the expected market value return and the actual market value return is recognized evenly over a period of five years. The gains and losses are measured starting with the year ended June 30, 1997. Adopted in the July 1, 2000 actuarial valuation.

### **Investment Earnings**

The annual rate of investment earnings of the assets of the System is assumed to be 7.75% per year, compounded annually. (Adopted effective July 1, 2004)

### **Interest on Member Contributions**

Interest on member contributions is assumed to accrue at a rate of 5% per annum, compounded annually. This assumption was set as of July 1, 2004.

### **Postretirement Benefit Increases**

On January 1 of each year, the retirement allowance payable must be increased by 1.5% if the retiree's most recent retirement effective date is at least 36 months prior to January 1 of the year in which the adjustment is to be made.

### **Future Salaries**

The rates of annual salary increase assumed for the purpose of the valuation are illustrated in Table A-2. In addition to increases in salary due to merit and longevity, this scale includes an assumed 4.5% annual rate of increase in the general wage level of the membership. The merit and longevity increases for the MUS members did not show a pattern of increasing or decreasing with service at the time of our most recent study. Therefore, the MUS members have a flat 1% merit and longevity assumption. The general wage increase assumption was adopted July 1, 2004 and the merit and longevity scales were adopted July 1, 2002.

Montana University System (MUS) members are assumed to have a 0.63% higher average final compensation to account for the larger than average annual compensation increases observed in the years immediately preceding retirement.



### **Service Retirement**

Table A-3 shows the annual assumed rates of retirement among members eligible for service retirement. Separate rates are used when a member is eligible for reduced benefits, for the first year a member is eligible for full benefits, and for the years following the first year a member is eligible for full benefits. The rates for General Members were adopted July 1, 2002. The rates for University Members were adopted July 1, 2002.

### **Disablement**

The rates of disablement used in this valuation are illustrated in Table A-4. The rates for General Members were adopted July 1, 2002. The rates for University Members were adopted July 1, 1996.

### **Mortality**

The mortality rates used in this valuation are illustrated in Table A-5. A written description of each table used is included in Table A-1. These rates were adopted July 1, 2000.

### **Other Terminations of Employment**

The rates of assumed future withdrawal from active service for reasons other than death, disability or retirement are shown for representative ages in Table A-6. These rates were adopted July 1, 2002.

### **Benefits for Terminating Members**

Members terminating with less than five years of service are assumed to request an immediate withdrawal of their contributions with interest. Table A-7 shows the assumed probability of retaining membership in the System among members terminating with five or more years of service. These rates were adopted July 1, 2002.

We estimated the present value of future benefits for terminated vested members based on their available contribution account.

### **Part-Time Employees**

The valuation data for active members identify part-time members, but give no indication as to the number of hours worked. As done in the past, we imputed a "part-time percentage" by comparing the pay received with their annual equivalent full-time salary. Part-time members earning less than \$1,000 during the last year were valued at their current member contribution balance.

### **Optional Retirement Program**

The total contribution received for the fiscal year ending June 30, 2004 was \$4,673,484. Based on a contribution rate of 4.04%, we assumed the total ORP payroll for the fiscal year to be \$115,680,297 (\$4,673,484 divided by 4.04%).



**Buybacks, Purchase of Service, and Military Service**

The active liabilities and normal cost were increased to 100.5% of their original value to fund this additional service based on a study of the System's experience for the five calendar years 1995 through 1999. Effective July 1, 2000.

**Probability of Marriage**

If death occurs in active status, all members are assumed to have an eligible surviving spouse and two children. The spouse is assumed to be the same age as the member.



**Montana University System  
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**Table A-1**

**Summary of Valuation Assumptions**

*(July 1, 2004)*

I. Economic assumptions	
A. General wage increases* (Adopted July 1, 2004)	4.50%
B. Investment return (Adopted July 1, 2004)	7.75%
C. Price Inflation Assumption (Adopted July 1, 2004)	3.50%
D. Growth in membership	0.00%
E. Postretirement benefit increases (Starting three years after retirement)	1.50%
F. Interest on member accounts (Adopted July 1, 2004)	5.00%
II. Demographic assumptions	
A. Individual salary increase due to promotion and longevity (General Member assumptions adopted July 1, 2002) (University Member assumptions adopted July 1, 2000)	Table A-2
B. Retirement (adopted July 1, 2002)	Table A-3
C. Disablement (adopted July 1, 2002) (General Member assumptions adopted July 1, 2002) (University Member assumptions adopted July 1, 1996)	Table A-4
D. Mortality among contributing members, service retired members, and beneficiaries 1994 Group Annuity Mortality Table, with ages set back 3 years for males and ages set back 1 year for females. (adopted July 1, 2000)	Table A-5
E. Mortality among disabled members Based on the IRS Social Security Disabled Mortality Tables published in Revenue Ruling 96-7. Males are 70% of the Male IRS table to age 80, grading into the 1983 Group Annuity Mortality Table for Males between ages 80 and 85. Females are 85% of the IRS table at all ages. (adopted July 1, 2000)	Table A-5
F. Other terminations of employment (adopted July 1, 2002)	Table A-6
G. Probability of retaining membership in the System upon vested termination (adopted July 1, 2002)	Table A-7

\* Montana University System (MUS) members are assumed to have a 0.63% higher average final compensation to account for the larger than average annual compensation increases observed in the years immediately preceding retirement.



**Montana University System  
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**Table A-2**

**Future Salaries**

Years of Service	General Members			University Members		
	Individual Merit & Longevity	General Wage Increase	Total Salary Increase	Individual Merit & Longevity	General Wage Increase	Total Salary Increase
1	4.51%	4.50%	9.01%	1.00%	4.50%	5.50%
2	4.09	4.50	8.59	1.00	4.50	5.50
3	3.46	4.50	7.96	1.00	4.50	5.50
4	2.94	4.50	7.44	1.00	4.50	5.50
5	2.52	4.50	7.02	1.00	4.50	5.50
6	2.21	4.50	6.71	1.00	4.50	5.50
7	1.89	4.50	6.39	1.00	4.50	5.50
8	1.68	4.50	6.18	1.00	4.50	5.50
9	1.47	4.50	5.97	1.00	4.50	5.50
10	1.31	4.50	5.81	1.00	4.50	5.50
11	1.16	4.50	5.66	1.00	4.50	5.50
12	1.00	4.50	5.50	1.00	4.50	5.50
13	0.84	4.50	5.34	1.00	4.50	5.50
14	0.68	4.50	5.18	1.00	4.50	5.50
15	0.58	4.50	5.08	1.00	4.50	5.50
16	0.47	4.50	4.97	1.00	4.50	5.50
17	0.37	4.50	4.87	1.00	4.50	5.50
18	0.26	4.50	4.76	1.00	4.50	5.50
19	0.21	4.50	4.71	1.00	4.50	5.50
20	0.16	4.50	4.66	1.00	4.50	5.50
21	0.11	4.50	4.61	1.00	4.50	5.50
22 & Up	0.00	4.50	4.50	1.00	4.50	5.50



**Montana University System  
Participation in the Teachers' Retirement System**

**Table A-3**

**Retirement  
Annual Rates**

Age	General Members			University Members		
	Eligible for Reduced Benefits	First Year Eligible for Full Benefits	Thereafter	Eligible for Reduced Benefits	First Year Eligible for Full Benefits	Thereafter
45		18.0%	9.5%		5.0%	4.9%
46		18.0	9.5		5.0	4.9
47		12.5	9.5		5.0	4.9
48		12.5	9.5		5.0	4.9
49	*	12.5	9.5	*	5.0	4.9
50	4.0%	12.5	9.5	1.9%	8.0	4.9
51	4.0	16.0	9.5	2.2	8.0	4.9
52	4.5	16.0	9.5	2.5	8.0	6.0
53	4.5	16.0	9.5	2.8	8.0	6.0
54	5.0	16.0	9.5	3.1	12.0	6.0
55	5.5	22.0	14.0	3.4	15.0	6.0
56	6.0	22.0	14.0	3.7	15.0	6.0
57	6.5	22.0	14.0	4.0	15.0	7.0
58	6.5	22.0	15.0	4.3	15.0	7.0
59	7.0	22.0	18.0	4.7	15.0	9.0
60	*	22.0	22.0	*	19.0	10.0
61		22.0	22.0		19.0	14.0
62		27.0	27.0		24.0	24.0
63		22.0	22.0		14.0	14.0
64		25.0	25.0		20.0	20.0
65		35.0	35.0		33.0	33.0
66		30.0	30.0		23.0	23.0
67		24.0	24.0		23.0	23.0
68		22.0	22.0		23.0	23.0
69		22.0	22.0		23.0	23.0
70		**	**		**	**

\*\* All benefits are unreduced after attaining age 60. Reduced benefits are not available before age 50.

\*\* Immediate retirement is assumed at age 70 or over.



**Montana University System  
Participation in the Teachers' Retirement System**

**Table A-4**

**Disablement  
Annual Rates**

<u>Age</u>	<u>General Members</u>	<u>University Members</u>
25	.010%	.003%
30	.010	.006
35	.020	.012
40	.040	.021
45	.080	.036
50	.130	.055
55	.180	.083
60	.260	.126



**Montana University System  
Participation in the Teachers' Retirement System**

**Table A-5**

**Mortality  
Annual Rates**

Age	Contributing Members, Service Retired Members and Beneficiaries		Disabled Members	
	Men	Women	Men	Women
25	.06%	.03%	1.92%	1.02%
30	.07	.03	2.15	1.26
35	.08	.04	2.39	1.50
40	.09	.07	2.69	1.75
45	.13	.09	3.01	2.04
50	.19	.13	3.36	2.38
55	.32	.21	3.72	2.77
60	.56	.39	4.07	3.23
65	1.01	.76	4.46	3.76
70	1.80	1.27	5.13	4.36
75	2.85	2.04	6.22	5.32
80	4.52	3.54	7.50	6.84
85	7.55	6.10	11.48	9.30

**Montana University System  
Participation in the Teachers' Retirement System**

**Table A-6**

**Other Terminations of Employment  
Among Members Not Eligible to Retire  
Annual Rates**

<u>Years of Service</u>	<u>General Members</u>	<u>University Members</u>
1	30.0%	33.0%
2	16.0	17.0
3	11.0	13.0
4	9.0	11.0
5	8.0	9.0
6	7.7	8.3
7	7.3	7.7
8	7.0	7.0
9	6.6	6.6
10	6.2	6.2
11	5.8	5.8
12	5.4	5.4
13	5.0	5.0
14	4.6	4.6
15	4.2	4.2
16	3.8	3.8
17	3.4	3.4
18 and up	3.0	3.0





**Montana University System  
Participation in the Teachers' Retirement System**

**Table A-7**

**Probability of Retaining Membership in the System  
Upon Vested Termination**

<u>Age</u>	<u>Probability of Retaining Membership</u>
25	54%
30	54
35	58
40	58
45	60
50	70
55	75



**Montana University System  
Participation in the Teachers' Retirement System**

**Appendix B**

**Summary of Benefit Provisions**

Effective Date	September 1, 1937
Vesting Period	5 years. No benefits are payable unless the member has a vested right, except the return of employee contributions with interest.
Final Compensation	Average of highest 3 consecutive years of earned compensation.
Normal Form of Benefits	Life only annuity. All benefits cease upon death; however, in no event will the member receive less than the amount of employee contributions with interest.
Normal Retirement Benefits	
Eligibility:	25 years of service or age 60 and 5 years of service.
Benefit:	The retirement benefit is equal to 1/60 of final compensation for each year of service.
Early Retirement Benefits	
Eligibility:	5 years of service and age 50.
Benefit:	The retirement benefit is calculated in the same manner as described for normal retirement, but the benefit is reduced 1/2 of 1% for each of the first 60 months early and 3/10 of 1% for each of the next 60 months early.



Death Benefit

- Eligibility: 5 years of service.
- Benefit: The death benefit is equal to 1/60 of final compensation for each year of service accrued at date of death, with an actuarial adjustment based on the relation of the member's age at death to the beneficiary's age. A monthly benefit of \$200 is paid to each child until age 18. In addition, a lump-sum benefit of \$500 is paid upon the death of an active or retired member.

Disability Benefit

- Eligibility: 5 years of service.
- Benefit: The disability benefit is equal to 1/60 of final compensation for each year of service accrued at date of disability. The minimum benefit is 1/4 of the final compensation.

Withdrawal Benefits

With less than 5 years of service, the accumulated employee contributions with interest are returned. With more than 5 years, the member may elect a refund of contributions with interest or leave the contributions and interest in the System and retain a vested right to retirement benefits.

Contributions

Member: 7.150% of compensation.  
Employer: 7.580% of compensation.

MCA 19-20-604 specifies that the employer contribution rate will be reduced by 0.11% when the amortization period of the System's unfunded actuarial accrued liability is 10 years or less according to the System's latest actuarial valuation.

Each employer within the University System shall contribute 4.04% of the salaries of the employees participating in the ORP until July 1, 2033.

Interest on Member Contributions

Interest on member contributions is currently being credited at a rate of 4.0% per annum.

Cost-of-Living Adjustments

On January 1 of each year, the retirement allowance payable must be increased by 1.5% if the retiree's most recent retirement effective date is at least 36 months prior to January 1 of the year in which the adjustment is to be made.



**Montana University System  
Participation in the Teachers' Retirement System**

**Appendix C**

**Valuation Data**

This valuation is based upon the membership of the System as of July 1, 2004. Membership data were supplied by the System and accepted for valuation purposes without audit. However, tests were performed to ensure that the data are sufficiently accurate for valuation purposes.

Table C-1 contains summaries of the data for contributing members. For full-time members, values shown in the tables are the numbers of members and their total and average annual salaries. For part-time members, only the numbers of members are shown.

MUS Active Members	Number	Annual Salaries in Millions
Full-Time Members	636	\$ 40.6
Part-Time Members*	<u>88</u>	<u>3.9</u>
Total Contributing Members*	724	\$ 44.5
Active Members with Annual Compensation less than \$1,000	<u>1</u>	
Total Active Members	725	

Non-MUS Active Members	Number	Annual Salaries in Millions
Full-Time Members	11,965	\$ 470.2
Part-Time Members*	<u>4,925</u>	<u>56.5</u>
Total Contributing Members*	16,890	\$ 526.7
Active Members with Annual Compensation less than \$1,000	<u>636</u>	
Total Active Members	17,526	

\* Excludes part-time members with annual compensation less than \$1,000.



Table C-2 presents distributions of the following:

- Members receiving service retirement benefits.
- Members receiving disability retirement benefits.
- Survivors of deceased retired members receiving benefits.
- Survivors of deceased active members.
- Child beneficiaries.
- Terminated vested members.

The following is a summary of retired members and beneficiaries currently receiving benefits:

Type of Annuitant	Number	Annual Benefits in Thousands
Service Retirement		
MUS	1,155	\$ 24,829
Non-MUS	7,814	122,012
Disability Retirement		
MUS	9	95
Non-MUS	190	1,590
Survivors of Deceased Retired Members		
MUS	147	1,897
Non-MUS	625	6,066
Survivors of Deceased Active Members		
MUS	62	735
Non-MUS	345	2,484
Child Beneficiaries		
MUS	0	0
Non-MUS	<u>28</u>	<u>67</u>
Total Annuitants	10,375	\$ 159,776

Terminated Members with Contributions Not Withdrawn*	Number	
	MUS	Non-Mus
Vested Terminated Members	146	1,474
Non-Vested Terminated Members	<u>322</u>	<u>7,539</u>
Total Terminated Members	468	9,013

\* Includes 209 records provided in the active data with salary equal to zero and contributions greater than zero.

**Montana University System  
Participation in the Teachers' Retirement System**

**Table C-1**

**Active Members – Full Time  
Distribution of Employees and Salaries as of July 1, 2004**

**Number of Employees - By Age Group - MUS**

Age	<u>Completed Years of Service</u>											Totals		
	0	1	2	3 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39		40+	
<25	-	-	-	-	-	-	-	-	-	-	-	-	-	0
25 to 29	-	-	-	-	-	-	-	-	-	-	-	-	-	0
30 to 34	-	-	1	-	3	1	-	-	-	-	-	-	-	5
35 to 39	-	1	-	1	1	5	1	-	-	-	-	-	-	9
40 to 44	-	-	-	1	2	12	11	1	-	-	-	-	-	27
45 to 49	-	-	-	1	5	23	19	19	2	-	-	-	-	69
50 to 54	-	2	-	2	3	21	41	43	20	3	-	-	-	135
55 to 59	-	-	-	-	2	24	32	53	55	31	6	-	-	203
60 to 64	-	-	-	-	-	5	13	18	29	39	27	2	-	133
65 to 69	-	-	-	-	-	1	4	8	4	11	14	4	-	46
70 and up	-	-	-	-	-	1	-	3	1	3	1	-	-	9
<b>Totals</b>	-	3	1	5	16	93	121	145	111	87	48	6	-	636



This work product was prepared solely for the Montana University System Participation in the Montana Teachers' Retirement System. It 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.

**Montana University System  
Participation in the Teachers' Retirement System**

**Active Members – Full Time  
Distribution of Employees and Salaries as of July 1, 2004**

**Annual Salaries in Thousands - By Age Group - MUS**

Age	<u>Completed Years of Service</u>											Totals		
	0	1	2	3 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39		40+	
<25	-	-	-	-	-	-	-	-	-	-	-	-	-	0
25 to 29	-	-	-	-	-	-	-	-	-	-	-	-	-	0
30 to 34	-	-	24	-	106	19	-	-	-	-	-	-	-	149
35 to 39	-	34	-	32	46	220	41	-	-	-	-	-	-	373
40 to 44	-	-	-	86	90	594	531	100	-	-	-	-	-	1,401
45 to 49	-	-	-	58	186	1,415	1,082	1,064	95	-	-	-	-	3,900
50 to 54	-	61	-	88	106	1,115	2,314	2,704	1,474	301	-	-	-	8,163
55 to 59	-	-	-	-	85	1,185	1,965	3,844	4,073	2,177	358	-	-	13,687
60 to 64	-	-	-	-	-	204	772	1,090	1,971	2,813	1,938	135	-	8,923
65 to 69	-	-	-	-	-	55	345	560	289	715	1,023	444	-	3,431
70 and up	-	-	-	-	-	9	-	214	66	199	68	-	-	556
Totals	-	95	24	264	619	4,816	7,050	9,576	7,968	6,205	3,387	579	-	40,583



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**Montana University System  
Participation in the Teachers' Retirement System**

**Active Members – Full Time  
Distribution of Employees and Salaries as of July 1, 2004**

**Average Annual Salary - By Age Group - MUS**

Age	Completed Years of Service												Totals	
	0	1	2	3 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40+		
<25	-	-	-	-	-	-	-	-	-	-	-	-	-	0
25 to 29	-	-	-	-	-	-	-	-	-	-	-	-	-	0
30 to 34	-	-	23,801	-	35,226	18,566	-	-	-	-	-	-	-	29,609
35 to 39	-	34,467	-	31,500	45,715	43,902	41,208	-	-	-	-	-	-	41,378
40 to 44	-	-	-	85,867	44,887	49,518	48,285	99,771	-	-	-	-	-	51,880
45 to 49	-	-	-	58,173	37,295	61,512	56,964	55,983	47,622	-	-	-	-	56,531
50 to 54	-	30,567	-	43,945	35,438	53,093	56,444	62,875	73,686	100,402	-	-	-	60,467
55 to 59	-	-	-	-	42,598	49,366	61,403	72,526	74,049	70,224	59,746	-	-	67,423
60 to 64	-	-	-	-	-	40,763	59,369	60,581	67,954	72,138	71,762	67,577	-	67,089
65 to 69	-	-	-	-	-	55,131	86,338	69,947	72,185	64,997	73,065	111,119	-	74,590
70 and up	-	-	-	-	-	9,083	-	71,412	66,263	66,272	67,820	-	-	61,802
Totals	-	31,867	23,801	52,686	38,697	51,772	58,272	66,036	71,778	71,325	70,558	96,605	-	63,808



This work product was prepared solely for the Montana University System Participation in the Montana Teachers' Retirement System. It 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.



**Montana University System  
Participation in the Teachers' Retirement System**

**Active Members – Full Time  
Distribution of Employees and Salaries as of July 1, 2004**

**Number of Employees - By Age Group - Non--MUS**

Age	<u>Completed Years of Service</u>											Totals		
	0	1	2	3 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39		40+	
<25	17	62	17	1	-	-	-	-	-	-	-	-	-	97
25 to 29	13	226	230	338	124	-	-	-	-	-	-	-	-	931
30 to 34	12	92	117	239	609	105	-	-	-	-	-	-	-	1,174
35 to 39	14	76	67	133	376	521	86	-	-	-	-	-	-	1,273
40 to 44	15	75	61	131	299	378	430	142	-	-	-	-	-	1,531
45 to 49	19	56	58	126	280	368	405	553	161	-	-	-	-	2,026
50 to 54	10	43	60	99	278	338	379	468	585	210	-	-	-	2,470
55 to 59	10	37	23	47	153	229	255	263	288	422	70	-	-	1,797
60 to 64	2	9	13	18	53	60	69	75	90	94	82	10	-	575
65 to 69	1	2	-	2	9	11	15	9	4	7	10	5	-	75
70 and up	-	2	-	3	2	1	2	-	2	1	2	1	-	16
Totals	113	680	646	1,137	2,183	2,011	1,641	1,510	1,130	734	164	16	-	11,965



**Montana University System  
Participation in the Teachers' Retirement System**

**Active Members – Full Time  
Distribution of Employees and Salaries as of July 1, 2004**

**Annual Salaries in Thousands - By Age Group - Non-MUS**

Age	Completed Years of Service												Totals	
	0	1	2	3 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40+		
<25	208	1,470	409	24	-	-	-	-	-	-	-	-	-	2,111
25 to 29	168	5,736	6,027	9,105	3,701	-	-	-	-	-	-	-	-	24,737
30 to 34	117	2,422	3,332	6,949	19,782	3,984	-	-	-	-	-	-	-	36,586
35 to 39	142	2,114	1,986	3,932	12,658	20,480	3,729	-	-	-	-	-	-	45,041
40 to 44	186	2,127	1,577	3,967	10,359	15,290	19,208	6,374	-	-	-	-	-	59,088
45 to 49	247	1,579	1,672	4,110	9,453	14,777	18,086	26,222	7,695	-	-	-	-	83,841
50 to 54	155	1,264	1,878	3,168	10,031	13,571	16,635	21,901	28,441	10,277	-	-	-	107,321
55 to 59	110	1,210	744	1,757	5,705	9,270	11,299	12,442	14,182	21,589	3,469	-	-	81,777
60 to 64	31	249	489	646	2,156	2,362	3,081	3,495	4,211	4,567	4,176	456	-	25,919
65 to 69	17	49	-	92	320	453	630	445	196	271	553	271	-	3,297
70 and up	-	45	-	48	39	26	64	-	100	47	94	44	-	507
Totals	1,381	18,265	18,114	33,798	74,204	80,213	72,732	70,879	54,825	36,751	8,292	771	-	470,225



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**Montana University System  
Participation in the Teachers' Retirement System**

**Active Members – Part Time  
Distribution of Employees and Salaries as of July 1, 2004**

**Average Annual Salary - By Age Group - Non-MUS**

Age	Completed Years of Service												Totals	
	0	1	2	3 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40+		
<25	12,215	23,706	24,038	24,370	-	-	-	-	-	-	-	-	-	21,757
25 to 29	12,955	25,381	26,204	26,939	29,847	-	-	-	-	-	-	-	-	26,571
30 to 34	9,755	26,327	28,476	29,077	32,482	37,946	-	-	-	-	-	-	-	31,164
35 to 39	10,127	27,813	29,648	29,562	33,664	39,310	43,358	-	-	-	-	-	-	35,381
40 to 44	12,420	28,361	25,849	30,280	34,645	40,450	44,671	44,888	-	-	-	-	-	38,595
45 to 49	12,989	28,194	28,835	32,616	33,762	40,156	44,657	47,418	47,795	-	-	-	-	41,383
50 to 54	15,499	29,391	31,301	32,001	36,084	40,150	43,893	46,796	48,618	48,939	-	-	-	43,450
55 to 59	11,042	32,697	32,367	37,380	37,286	40,479	44,309	47,309	49,243	51,158	49,561	-	-	45,507
60 to 64	15,252	27,710	37,581	35,907	40,676	39,369	44,652	46,602	46,789	48,582	50,932	45,642	-	45,077
65 to 69	17,385	24,436	-	45,977	35,544	41,226	41,971	49,399	48,920	38,694	55,321	54,295	-	43,960
70 and up	-	22,353	-	15,975	19,696	25,687	32,199	-	50,110	46,875	47,125	43,649	-	31,694
Totals	12,224	26,859	28,040	29,726	33,991	39,888	44,322	46,940	48,518	50,068	50,568	48,222	-	39,300



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**Montana University System  
Participation in the Teachers' Retirement System**

**Active Members – Part Time  
Distribution of Employees and Salaries as of July 1, 2004**

**Number of Employees - By Age Group - MUS**

Age	Completed Years of Service												Totals	
	0	1	2	3 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40+		
<25	-	-	-	-	-	-	-	-	-	-	-	-	-	0
25 to 29	-	-	-	-	-	-	-	-	-	-	-	-	-	0
30 to 34	-	-	-	-	1	-	-	-	-	-	-	-	-	1
35 to 39	-	-	-	-	1	1	-	-	-	-	-	-	-	2
40 to 44	-	1	-	-	-	1	1	1	-	-	-	-	-	4
45 to 49	-	-	-	1	1	5	1	1	-	-	-	-	-	9
50 to 54	1	-	-	1	3	6	2	3	-	-	-	-	-	16
55 to 59	-	-	-	-	2	5	5	3	3	3	-	-	-	21
60 to 64	-	-	-	-	1	2	5	4	4	3	5	-	-	24
65 to 69	-	-	-	1	-	1	-	1	-	2	4	-	-	9
70 and up	-	-	-	-	1	-	1	-	-	-	-	-	-	2
Totals	1	1	-	3	10	21	15	13	7	8	9	-	-	88

**Number of Employees - By Age Group - Non-MUS**

Age	Completed Years of Service												Totals	
	0	1	2	3 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40+		
<25	137	26	15	7	1	-	-	-	-	-	-	-	-	186
25 to 29	201	135	48	59	10	-	-	-	-	-	-	-	-	453
30 to 34	85	80	52	78	127	20	-	-	-	-	-	-	-	442
35 to 39	106	100	55	87	80	76	11	-	-	-	-	-	-	515
40 to 44	108	105	95	148	161	58	52	10	1	-	-	-	-	738
45 to 49	96	107	98	149	217	104	46	43	4	-	-	-	-	864
50 to 54	80	108	87	100	218	123	66	32	26	3	-	-	-	843
55 to 59	42	74	41	56	103	93	47	18	9	26	-	-	-	509
60 to 64	35	29	30	30	48	35	14	12	7	4	2	1	-	247
65 to 69	7	5	20	15	19	15	5	2	1	1	-	-	-	90
70 and up	3	7	3	4	10	4	6	1	-	-	-	-	-	38
Totals	900	776	544	733	994	528	247	118	48	34	2	1	-	4,925



This work product was prepared solely for the Montana University System Participation in the Montana Teachers' Retirement System. It 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.

**Montana University System  
Participation in the Teachers' Retirement System**

**Table C-2**

**Distribution of Inactive Lives**

**MUS Members Receiving Service Retirement Benefits as of July 1, 2004**

<u>Age</u>	<u>Number of Persons</u>	<u>Annual Benefits in Thousands</u>	<u>Average Annual Benefits</u>
<50	1	\$ 18	\$ 17,891
50 to 54	14	313	22
55 to 59	70	1,550	22,142
60 to 64	177	4,272	24,136
65 to 69	268	6,582	24,559
70 to 74	254	5,853	23,043
75 to 79	158	3,018	19,100
80 to 84	123	2,114	17,188
85 to 89	51	711	13,947
90 and up	39	398	10,205
<b>Total</b>	<b>1,155</b>	<b>24,829</b>	<b>21,497</b>

**Non-MUS Members Receiving Service Retirement Benefits as of July 1, 2004**

<u>Age</u>	<u>Number of Persons</u>	<u>Annual Benefits in Thousands</u>	<u>Average Annual Benefits</u>
<50	27	\$ 515	\$ 19,057
50 to 54	416	7,872	19
55 to 59	1,181	23,188	19,634
60 to 64	1,621	30,613	18,885
65 to 69	1,338	22,836	17,067
70 to 74	1,063	15,875	14,934
75 to 79	776	9,710	12,513
80 to 84	566	5,624	9,936
85 to 89	450	3,514	7,810
90 and up	376	2,266	6,027
<b>Total</b>	<b>7,814</b>	<b>122,012</b>	<b>15,615</b>



**Milliman**

**Montana University System  
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**Distribution of Inactive Lives**

**MUS Members Receiving Disability Retirement Benefits as of July 1, 2004**

<u>Age</u>	<u>Number of Persons</u>	<u>Annual Benefits in Thousands</u>	<u>Average Annual Benefits</u>
<50	-	\$ -	\$ -
50 to 54	-	-	-
55 to 59	3	51	17,113
60 to 64	1	8	8,039
65 to 69	1	6	5,638
70 to 74	1	5	5,240
75 to 79	2	21	10,569
80 to 84	-	-	-
85 to 89	1	4	3,997
90 and up	-	-	-
<b>Total</b>	<b>9</b>	<b>95</b>	<b>10,599</b>

**Non-MUS Members Receiving Disability Retirement Benefits as of July 1, 2004**

<u>Age</u>	<u>Number of Persons</u>	<u>Annual Benefits in Thousands</u>	<u>Average Annual Benefits</u>
<50	12	\$ 97	\$ 8,121
50 to 54	27	218	8,077
55 to 59	35	310	8,853
60 to 64	31	289	9,325
65 to 69	26	251	9,660
70 to 74	17	156	9,154
75 to 79	18	133	7,379
80 to 84	13	73	5,632
85 to 89	9	54	5,998
90 and up	2	9	4,506
<b>Total</b>	<b>190</b>	<b>1,590</b>	<b>8,370</b>

**Montana University System  
Participation in the Teachers' Retirement System**

**Distribution of Inactive Lives**

**MUS Survivors of Deceased Retired Members as of July 1, 2004**

<u>Age</u>	<u>Number of Persons</u>		<u>Annual Benefits in Thousands</u>		<u>Average Annual Benefits</u>
<50	4	\$	56	\$	14,010
50 to 54	3		40		13,390
55 to 59	3		33		10,843
60 to 64	10		185		18,513
65 to 69	21		309		14,693
70 to 74	13		188		14,448
75 to 79	19		247		13,000
80 to 84	41		510		12,434
85 to 89	20		223		11,133
90 and up	13		108		8,274
<b>Total</b>	<b>147</b>		<b>1,897</b>		<b>12,906</b>

**Non-MUS Survivors of Deceased Retired Members as of July 1, 2004**

<u>Age</u>	<u>Number of Persons</u>		<u>Annual Benefits in Thousands</u>		<u>Average Annual Benefits</u>
<50	26	\$	193	\$	7,411
50 to 54	22		192		8,714
55 to 59	37		417		11,274
60 to 64	56		651		11,623
65 to 69	59		612		10,375
70 to 74	96		1,207		12,575
75 to 79	87		920		10,576
80 to 84	109		884		8,107
85 to 89	82		646		7,879
90 and up	51		344		6,754
<b>Total</b>	<b>625</b>		<b>6,066</b>		<b>9,706</b>

**Montana University System  
Participation in the Teachers' Retirement System**

**Distribution of Inactive Lives**

**MUS Survivors of Deceased Active Members as of July 1, 2004**

<u>Age</u>	<u>Number of Persons</u>		<u>Annual Benefits in Thousands</u>		<u>Average Annual Benefits</u>
<50	12	\$	65	\$	5,449
50 to 54	3		33		10,969
55 to 59	6		56		9,296
60 to 64	10		188		18,813
65 to 69	3		19		6,181
70 to 74	7		115		16,477
75 to 79	7		116		16,606
80 to 84	11		128		11,596
85 to 89	2		10		5,029
90 and up	1		5		5,300
<b>Total</b>	<b>62</b>		<b>735</b>		<b>11,859</b>

**Non-MUS Survivors of Deceased Active Members as of July 1, 2004**

<u>Age</u>	<u>Number of Persons</u>		<u>Annual Benefits in Thousands</u>		<u>Average Annual Benefits</u>
<50	66	\$	357	\$	5,413
50 to 54	40		301		7,530
55 to 59	49		403		8,226
60 to 64	39		335		8,580
65 to 69	35		318		9,100
70 to 74	31		262		8,465
75 to 79	29		227		7,812
80 to 84	27		154		5,713
85 to 89	14		69		4,964
90 and up	15		56		3,747
<b>Total</b>	<b>345</b>		<b>2,484</b>		<b>7,199</b>



**Montana University System  
Participation in the Teachers' Retirement System**

**Distribution of Inactive Lives**

**MUS Terminated Vested Members as of July 1, 2004  
Number of Persons**

Age	Number
<25	-
25 to 29	-
30 to 34	1
35 to 39	2
40 to 44	13
45 to 49	22
50 to 54	35
55 to 69	44
60 to 64	25
65 to 69	4
70 & above	-
<b>Total</b>	<b>146</b>

**Non-MUS Terminated Vested Members as of July 1, 2004  
Number of Persons**

Age	Number
<25	-
25 to 29	6
30 to 34	80
35 to 39	155
40 to 44	190
45 to 49	289
50 to 54	358
55 to 69	290
60 to 64	86
65 to 69	16
70 & above	4
<b>Total</b>	<b>1,474</b>



**Montana University System  
Participation in the Teachers' Retirement System**

**Distribution of Inactive Lives**

**MUS Child Beneficiaries as of July 1, 2004  
Number of Persons**

<u>Age</u>	<u>Number</u>
<5	0
5 to 6	0
7 to 8	0
9 to 10	0
11 to 12	0
13 to 14	0
15 to 16	0
17 to 18	0
Total	0

**Non-MUS Child Beneficiaries as of July 1, 2004  
Number of Persons**

<u>Age</u>	<u>Number</u>
<5	0
5 to 6	2
7 to 8	2
9 to 10	2
11 to 12	7
13 to 14	3
15 to 16	6
17 to 18	6
Total	28

\* Child Beneficiaries all receive \$200 per month, for a total of \$67,200 per year.



**Montana University System  
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**Appendix D**

**Glossary**

The following definitions are largely excerpts from a list adopted in 1981 by the major actuarial organizations in the United States. In some cases the definitions have been modified for specific applicability to the Teachers' Retirement System Retirement System. Defined terms are capitalized throughout this Appendix.

**Actuarial Assumptions**

Assumptions as to the occurrence of future events affecting pension costs, such as: mortality, withdrawal, disablement, and retirement; changes in compensation, rates of investment earnings, and asset appreciation or depreciation; procedures used to determine the Actuarial Value of Assets; and other relevant items.

**Actuarial Cost Method**

A procedure for determining the Actuarial Present Value of pension plan benefits and expenses and for developing an actuarially equivalent allocation of such value to time periods, usually in the form of a Normal Cost and an Actuarial Accrued Liability.

**Actuarial Gain (Loss)**

A measure of the difference between actual experience and that expected based upon a set of Actuarial Assumptions during the period between two Actuarial Valuation dates, as determined in accordance with a particular Actuarial Cost Method.

**Actuarial Present Value**

The value of an amount or series of amounts payable or receivable at various times, determined as of a given date by the application of a particular set of Actuarial Assumptions.

**Actuarial Valuation**

The determination, as of a valuation date, of the Normal Cost, Actuarial Accrued Liability, Actuarial Value of Assets, and related Actuarial Present Values for a pension plan.

**Actuarial Value of Assets**

The value of cash, investments and other property belonging to a pension plan, as used by the actuary for the purpose of an Actuarial Valuation.



### **Actuarially Equivalent**

Of equal Actuarial Present Value, determined as of a given date with each value based on the same set of Actuarial Assumptions.

### **Amortization Payment**

That portion of the pension plan contribution which is designed to pay interest on and to amortize the Unfunded Actuarial Accrued Liability.

### **Normal Cost**

That portion of the Actuarial Present Value of pension plan benefits and expenses which is allocated to a valuation year by the Actuarial Cost Method.

### **Actuarial Accrued Liability**

That portion, as determined by a particular Actuarial Cost Method, of the Actuarial Present Value of pension plan benefits and expenses which is not provided for by future Normal Costs.

### **Unfunded Actuarial Accrued Liability**

The excess of the Actuarial Accrued Liability over the Actuarial Value of Assets.

### **Accrued Benefit**

The amount of an individual's benefit (whether or not vested) as of a specific date, determined in accordance with the terms of a pension plan and based on compensation and service to that date.

### **Projected Benefits**

Those pension plan benefit amounts which are expected to be paid at various future times under a particular set of Actuarial Assumptions, taking into account such items as the effect of advancement in age and past and anticipated future compensation and service credits.

### **Unaccrued Benefits**

The excess of an individual's Projected Benefits over the Accrued Benefits as of a specified date.

