

**PUBLIC EMPLOYEES'  
RETIREMENT SYSTEM  
of the  
STATE OF MONTANA**

**ACTUARIAL VALUATION  
as of JULY 1, 2004**

Prepared by

Mark O. Johnson, F.S.A.  
Consulting Actuary



**Milliman**

*Consultants and Actuaries*

111 SW Fifth Avenue, Suite 3700  
Portland, OR 97204  
Tel +1 503 227.0634  
Fax +1 503 227.7956  
www.milliman.com

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Retirement Board  
Public Employees' Retirement System  
State of Montana

Dear Members of the Board:

At your request, we have performed an actuarial valuation of the Montana Public Employees' Retirement System as of July 1, 2004. Details about the actuarial valuation are contained in the following report.

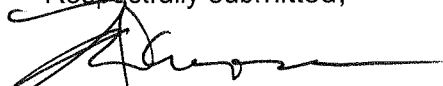
I certify that the information included in this report is complete and accurate to the best of my knowledge and belief. All calculations have been prepared in accordance with generally recognized and accepted actuarial principles and practices that are consistent with the applicable Standards of Practice adopted by the American Academy of Actuaries.

Milliman has been engaged by MPERA as an independent actuary. The undersigned is a Fellow of the Society of Actuaries, a Member of the American Academy of Actuaries, and an Enrolled Actuary, and is experienced in performing actuarial valuations for large public employee retirement systems.

Actuarial computations presented in this report are for purposes of analyzing the sufficiency of future contributions. Actuarial computations under GASB Statement No. 25 are for purposes of fulfilling financial accounting requirements. The computations in this report have been made on a basis consistent with our understanding of the Retirement Board's funding policies and GASB Statement No. 25. Determinations for purposes other than meeting these requirements may be significantly different from the results contained in this report. Accordingly, different 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 is obtained from Milliman.

Respectfully submitted,



Mark O. Johnson, F.S.A., M.A.A.A., E.A.  
Principal and Consulting Actuary

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**MONTANA PUBLIC EMPLOYEES' RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF JULY 1, 2004**

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**TABLE OF CONTENTS**

		PAGE
<b>LETTER OF TRANSMITTAL</b>		
<b>SECTION</b>		
1	SCOPE OF THE REPORT .....	1
2	ACTUARIAL CERTIFICATION .....	2
3	SUMMARY OF FINDINGS AND ANALYSIS OF THE FUNDING LEVEL.....	3
4	ACTUARIAL VALUATION RESULTS.....	12
<b>APPENDICES</b>		
A	ACTUARIAL METHODS AND ASSUMPTIONS .....	26
B	PROVISIONS OF GOVERNING LAW.....	36
C	VALUATION DATA.....	38
D	GLOSSARY .....	49

**MONTANA PUBLIC EMPLOYEES' RETIREMENT SYSTEM**  
**ACTUARIAL VALUATION AS OF JULY 1, 2004**

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**SECTION 1**  
**SCOPE OF THE REPORT**

This report presents the results of our actuarial valuation of the System as of July 1, 2004.

In reading the Actuarial Certification in Section 2, please pay particular attention to the guidelines employed in the preparation of this report. We also comment on the sources and reliability of both the data and the actuarial assumptions upon which our findings depend. Those comments are the basis for our certification that this report is complete and accurate to the best of our knowledge and belief.

A summary of the findings resulting from this valuation is presented in Section 3 of the report and the underlying calculations are summarized in more detail in Section 4.

All of the calculations of the valuation were carried out using certain assumptions as to the future experience of the System in matters affecting the actuarial cost. Appendix A summarizes the most important of these assumptions and describes the actuarial methods used to calculate costs.

Appendix B outlines the benefit provisions of the System.

The membership data which were supplied to us are summarized in Appendix C.

**MONTANA PUBLIC EMPLOYEES' RETIREMENT SYSTEM**  
**ACTUARIAL VALUATION AS OF JULY 1, 2004**

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**SECTION 2**  
**ACTUARIAL CERTIFICATION**

To the best of our knowledge and belief, this report is complete and accurate and contains sufficient information to fully and fairly disclose the funded condition of the Public Employees' Retirement System as of July 1, 2004.

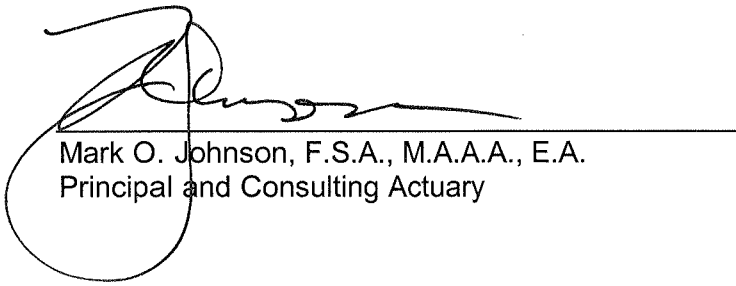
In preparing the valuation, we relied upon the financial information, membership data, and benefit provisions furnished by the System. Although we did not audit this data, we compared the data for this and the prior valuation and tested for reasonableness. Based on these tests, we believe the data to be sufficiently accurate for the purposes of our calculations. It should be noted that if any data or other information is inaccurate or incomplete, our calculations may need to be revised.

The Retirement Board has sole authority to determine the actuarial assumptions and methods used for the valuation of the System. The Board adopted all of the actuarial methods and assumptions used in the 2004 valuation.

The findings have been determined according to actuarial assumptions and methods that were chosen on the basis of recent experience of the System and of current expectations concerning future economic conditions. In our opinion, the assumptions used in the actuarial valuation are appropriate for purposes of the valuation, are internally consistent, and reflect reasonable expectations. The assumptions represent our best estimate of future conditions affecting the System. Nevertheless, the emerging costs of the System will vary from those presented in this report to the extent that actual experience differs from that projected by the assumptions.

The actuarial valuation was prepared in accordance with generally recognized and accepted actuarial principles and practices which are consistent with the applicable Standards of Practice adopted by the Actuarial Standards Board of the American Academy of Actuaries. In addition, the assumptions and methods used meet the parameters set for disclosures by Governmental Accounting Standards Board Statement No. 25.

The undersigned is an independent actuary, a Fellow of the Society of Actuaries, a Member of the American Academy of Actuaries, an Enrolled Actuary, and experienced in performing valuations for large public employee retirement systems.



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Mark O. Johnson, F.S.A., M.A.A.A., E.A.  
Principal and Consulting Actuary

**MONTANA PUBLIC EMPLOYEES' RETIREMENT SYSTEM**  
**ACTUARIAL VALUATION AS OF JULY 1, 2004**

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**SECTION 3**  
**SUMMARY OF FINDINGS AND ANALYSIS OF THE FUNDING LEVEL**

The costs of a retirement system are not determined by the actuary. The ultimate costs of a system are determined by adding all of the benefits and expenses that are paid, and subtracting all investment earnings. These costs cannot be determined exactly until the last member or beneficiary has received the final benefit payment due.

The purpose of an actuarial valuation is to provide a timely best estimate of the ultimate costs in order to allocate them to the appropriate generation of members and taxpayers. The ideal goal is for contributions to remain essentially a constant percentage of covered payroll as long as the assumptions and methods reflect the emerging experience of the system and its members with reasonable accuracy.

**Membership Data**

We have developed the following comparisons between the membership in this and the prior actuarial valuations:

	<u>June 30, 2004</u>	<u>June 30, 2002</u>
Number of Members		
Retirees and Beneficiaries	14,834	14,116
Vested Terminated	2,362	2,150
Non-vested Terminated*	9,132	10,944
Active	<u>28,201</u>	<u>29,808</u>
Total Membership	54,529	57,018

\* Includes 1,745 members with a zero account balance in 2002 and 70 members with a zero account balance in 2004.

More detailed membership statistics are shown in Appendix C.

**Determination of Normal Cost**

The **Normal Cost** represents the cost assigned to an average member for a given year such that it would meet the continuing costs of that particular benefit, if contributed each year starting with the date of membership. The Entry Age Actuarial Cost Method is designed to produce a Normal Cost that remains a level percentage of salaries, so it is best expressed as a rate.

The following chart shows the Normal Cost from the 2002 valuation compared to the Normal Cost in this valuation. **Table 1** provides more details on the Normal Cost. We have calculated the Normal Cost two times for the 2004 valuation: first based on the prior assumptions, and secondly including the impact of the revised actuarial assumptions adopted by the Board.

**MONTANA PUBLIC EMPLOYEES' RETIREMENT SYSTEM**  
**ACTUARIAL VALUATION AS OF JULY 1, 2004**

	<u>2004 Actuarial Valuation</u>		<u>2002 Actuarial Valuation</u>
	<u>Revised Assumptions</u>	<u>Previous Assumptions</u>	
<b>Normal Cost Rate</b>			
Service Retirement	9.03%	9.17%	9.09%
Disability Retirement	0.32	0.32	0.32
Death	0.53	0.57	0.56
Withdrawal	<u>2.20</u>	<u>2.21</u>	<u>2.24</u>
<b>Total Normal Cost Rate</b>	<b>12.08%</b>	<b>12.27%</b>	<b>12.21%</b>

The Normal Cost Rate is expected to remain fairly stable as long as the benefits are not amended, experience emerges as assumed, the demographic characteristics of the membership remain reasonably consistent, and the actuarial assumptions are not changed.

**Determination of the Actuarial Liability**

The next step in the actuarial valuation process is to project all future benefit payments from the System for current members and retirees. The level of benefits currently being paid is known, but assumptions are needed to estimate how long they will be paid, and the amount and timing of the payment of future benefits for active and inactive members who are not currently receiving payments.

The summation of the discounted values of all of the projected benefit payments for all current members, at the assumed rate of return, is called the **Actuarial Present Value of Projected Benefits**. Details are shown in **Table 2** and summarized below.

(\$000)	<u>2004 Actuarial Valuation</u>		<u>2002 Actuarial Valuation</u>
	<u>Revised Assumptions</u>	<u>Previous Assumptions</u>	
<b>Actuarial Present Value of Projected Benefits</b>			
Retired Members	\$ 1,522,256	\$ 1,501,337	\$ 1,264,638
Inactive Members	117,889	116,594	101,996
Active Members	<u>2,672,565</u>	<u>2,693,360</u>	<u>2,538,273</u>
<b>Total PVPB</b>	<b>\$ 4,312,710</b>	<b>\$ 4,311,291</b>	<b>\$ 3,904,907</b>

The **Actuarial Present Value of Future Normal Costs** is the value of all remaining Normal Costs expected to be received over the future working lifetime of current active members. The Actuarial Present Value of Future Normal Costs is subtracted from the Actuarial Present Value of Projected Benefits to arrive at the **Actuarial Liability**, the assets that would exist if the current Normal Cost Rate had been paid for all members since entry into the System, and if all actuarial assumptions had been realized. The following is a summary from **Table 2**.

**MONTANA PUBLIC EMPLOYEES' RETIREMENT SYSTEM**  
**ACTUARIAL VALUATION AS OF JULY 1, 2004**

(\$000)	2004 Actuarial Valuation		2002 Actuarial Valuation
	Revised Assumptions	Previous Assumptions	
<b>Actuarial Present Value of:</b>			
Projected Benefits	\$ 4,312,710	\$ 4,311,291	\$ 3,904,907
Future Normal Costs	<u>798,625</u>	<u>815,280</u>	<u>827,143</u>
<b>Actuarial Liability</b>	<b>\$ 3,514,085</b>	<b>\$ 3,496,011</b>	<b>\$ 3,077,764</b>

**Development of Actuarial Value of Assets**

The next step in the valuation process is to calculate the **Actuarial Value of Assets** that will be used to determine the funding status of the System. The market value of assets was reported to us as of June 30, 2004. Details from the System's financial statements are contained in **Table 3** and **Table 4**.

Because the underlying calculations in the actuarial valuation are long-term in nature, it is advantageous to smooth out short-term fluctuations in the market value of assets. The asset smoothing method projects an Expected Value of Assets using the assumed rate of investment return, then recognizes the difference between the Expected Value and the Market Value over a four-year period. The calculation of the Actuarial Value of Assets is shown in **Table 5** and summarized below.

(\$000)	Gain or (Loss)	Reserve Factor	Smoothing Reserve	Value of Assets
<b>Market Value on June 30, 2004</b>				\$ 3,029,910
2001-02	\$ (425,030)	25%	\$ (106,257)	
2002-03	(38,134)	50%	(19,067)	
2003-04	143,930	75%	<u>107,947</u>	
Smoothing Reserve			\$ (17,377)	<u>17,377</u>
<b>Actuarial Value of Assets (Market Value less Smoothing Reserve)</b>				<b>\$ 3,047,287</b>

Due to the asset smoothing method, there is \$17 million of net investment losses that have not yet been recognized (the difference between the Actuarial and Market Value of Assets). Absent investment returns in excess of the assumed rate of 8% in the next few years to offset the unrecognized investment losses, the current negative balance of the Smoothing Reserve will gradually be reflected in the Actuarial Value of Assets.

The Actuarial Value of Assets exceeds the Market Value of Assets by less than 1%. **Table 6** shows a brief history of the difference between the Actuarial and Market Values of Assets. The table also shows an estimated rate of return for the last four years on both bases.



**MONTANA PUBLIC EMPLOYEES' RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF JULY 1, 2004**

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**Unfunded Actuarial Liability**

The **Unfunded Actuarial Liability** is the excess of the Actuarial Liability over the Actuarial Value of Assets, which represents a liability that must be funded over time. Contributions in excess of the Normal Cost are used to amortize the Unfunded Actuarial Liability. An **Actuarial Surplus** exists if the Actuarial Value of Assets exceeds the Actuarial Liability. The calculation of the Unfunded Actuarial Liability or Actuarial Surplus is shown in **Table 7** and summarized below.

(\$000)	2004 Actuarial Valuation		2002 Actuarial Valuation
	Revised Assumptions	Previous Assumptions	
Actuarial Liability	\$ 3,514,085	\$ 3,496,011	\$ 3,077,764
Actuarial Value of Assets	<u>3,047,287</u>	<u>3,047,287</u>	<u>3,076,781</u>
<b>Unfunded Actuarial Liability</b>	<b>\$ 466,798</b>	<b>\$ 448,724</b>	<b>\$ 983</b>
<b>Funded Ratio</b>	<b>87%</b>	<b>87%</b>	<b>100%</b>

The **Funded Ratio** is equal to the Actuarial Value of Assets divided by the Actuarial Liability. A Funded Ratio of 100% means the Actuarial Value of Assets equals the Actuarial Liability, and the System could be financed by contributions equal to the Normal Cost, if all future experience emerges as assumed.

**Actuarial Gains and Losses**

Comparing the Unfunded Actuarial Liability as of two valuation dates does not provide enough information to determine if there were actuarial gains or losses. The correct comparison is between the Unfunded Actuarial Liability on the valuation date and the Expected Unfunded Actuarial Liability projected from the prior valuation date using the actuarial assumptions in effect for the two-year period.

**Table 8** shows the Actuarial Liability as of June 30, 2002, and the elements to project that figure forward to June 30, 2004: the Normal Cost, less benefits paid, plus a charge for interest at the assumed rate of 8% per year.

The same table shows the Actuarial Value of Assets as of June 30, 2002, and the elements to project that figure forward to June 30, 2004: The net cash flow (contributions less benefits), plus a credit for interest at the assumed rate of 8%.

The following is a summary of the actuarial gains or losses during the two-year period.

**MONTANA PUBLIC EMPLOYEES' RETIREMENT SYSTEM**  
**ACTUARIAL VALUATION AS OF JULY 1, 2004**

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	(\$000)
<b>Unfunded Actuarial Liability</b>	
Actual as of June 30, 2002	\$ 983
Expected as of June 30, 2004	\$ (33,549)
Actual as of June 30, 2004	<u>466,798</u>
<b>Actuarial (Gain) or Loss</b>	<b>\$ 500,347</b>
 <b>(Gain) or Loss by Source</b>	
Investment Loss	\$ 477,405
Liability Loss	4,867
Revised Actuarial Assumptions	<u>18,075</u>
Net from All Sources	<b>\$ 500,347</b>

**Plan Choice Rate**

The current employer contribution rate for members of the Defined Contribution Retirement Plan (DCRP) and the Optional Retirement Plan (ORP) who would have been in PERS is determined as follows:

(Percent of Salary)	DCRP	ORP
Member Account in DCRP or ORP	4.19%	4.49%
Long-term Disability Plan (DCRP only)	0.30	0.00
Education Fund	0.04	0.04
Plan Choice Rate to DBRP (PCR)	<u>2.37</u>	<u>2.37</u>
<b>Total Contribution Rate</b>	<b>6.90%</b>	<b>6.90%</b>

The Plan Choice Rate (PCR) is the percent of the employer contribution allocated to the Defined Benefit Retirement Plan for members who choose the Defined Contribution Retirement Plan or the Optional Retirement Plan. The PCR is required by statute and actuarially determined to maintain the financial stability of the Defined Benefit Retirement Plan (DBRP).

The Legislature did not want the cost of the DBRP to increase due to the elections of members to join the alternative programs. The enabling legislation appropriately established the PCR to provide a mechanism to prevent the costs of the DBRP from increasing solely due to the transfer of members to the other plans.

Without the PCR, there are two reasons the DBRP costs could potentially increase; one is the financing of the Unfunded Actuarial Liability (UAL) at the time of the transfers, and the other is the potential for an increase in the Normal Cost Rate.

1. If there is an Unfunded Actuarial Liability in the DBRP at the time of the transfers, the simple fact that there will be fewer members in the DBRP to spread the amortization of the UAL will increase the rate of DBRP pay necessary to amortize the UAL. The PCR provides that the amortization of the DBRP UAL at the time of the transfer will be financed over the sum of payroll of the DBRP and DCRP members. This method

**MONTANA PUBLIC EMPLOYEES' RETIREMENT SYSTEM**  
**ACTUARIAL VALUATION AS OF JULY 1, 2004**

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ensures a continuation of the amortization schedule that was in place just prior to the transfers.

The legislation provided a starting point for this element of the PCR equal to 2.37% of the payroll of DCRP members and the ORP members who would have been in the DBRP.

2. Compared to the members who remain in the DBRP, if the transferring DCRP and ORP members are, on average, either younger at the time of hire, or have a shorter career, the DBRP Normal Cost Rate could increase. The DBRP membership will become, on average, more expensive because the average length of service at retirement will be longer or the career over which the benefit can be financed will be shorter. The dollar amount of the increase in the DBRP Normal Cost will be financed as a percentage of DCRP and ORP payroll. In other words, the DCRP and ORP members will be funding any increase in the Normal Cost of the DBRP due to their election not to participate in the DBRP.

The legislature did not provide a starting point for this element of the PCR because it depends on the demographics of those who elect the alternative programs.

**Unfunded Actuarial Liability:** Table 9-A illustrates the determination of the Unfunded Actuarial Liability of the DBRP that is allocated to the members of the alternative programs. The Unfunded Actuarial Liability as of June 30, 2002 (the last valuation prior to the effective date of the DCRP) was brought forward to June 30, 2003 and allocated between the DBRP and the alternative programs. The allocation was based on annualized payroll as of June 30, 2003.

	(\$000)
<b>Unfunded Actuarial Liability</b>	
Estimated System UAL as of June 30, 2003	\$ 236,353
Percentage of Payroll for DCRP & ORP	x 4.34%
<b>Allocated UAL to DCRP &amp; ORP</b>	<b>\$ 10,246</b>
<b>Adjustments as of June 30, 2003</b>	
Actuarial (Gain) or Loss on Transfer	(4,381)
PCR Contributions with 8% Earnings	<u>(579)</u>
<b>PCR-UAL as of June 30, 2003</b>	<b>\$ 5,286</b>
<b>Adjustments as of June 30, 2004</b>	
Assumed Earnings at 8%	423
PCR Contributions with 8% Earnings	(1,425)
Recognition of Prior Investment Losses	<u>9,193</u>
<b>PCR-UAL as of June 30, 2004</b>	<b>\$ 13,477</b>

Two adjustments were made to arrive at the June 30, 2003 UAL to arrive at the PCR-UAL of \$5.3 million.

- The actuarial (gain) or loss due to the transfers was calculated as of June 30, 2003. The expected Actuarial Liability of the transferees was compared to the assets that were

**MONTANA PUBLIC EMPLOYEES' RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF JULY 1, 2004**

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transferred from the DBRP. This adjustment was described in materials provided to us related to the enactment of the DCRP.

- The PCR contributions that were deposited in the 2002-03 plan year were accumulated with interest to June 30, 2003.

The next step in the process is shown in **Table 9-B**. In order to bring the PCR-UAL forward to June 30, 2004, we made the following adjustments:

- Assumed earnings at the rate of 8% per year were charged to the UAL.
- The PCR contributions that were deposited in the 2003-04 plan year were accumulated with interest to June 30, 2004.
- Due to the asset smoothing method, a portion of the unrecognized investment losses as of June 30, 2003 were recognized as of June 30, 2004. The PCR-UAL was charged with 4.34% of the prior investment losses that were recognized as of June 30, 2004.

**Normal Cost Rate:** The statute calls for the members of the alternative programs who could have been in the DBRP to finance the increase in the Normal Cost Rate associated with their transfer. **Table 9-C** shows that the Normal Cost Rate for the DBRP would have been 12.07% had the alternative program options not existed. The Normal Cost Rate in this valuation for the DBRP members is 12.08% of salaries. Since the DBRP payroll is about 20 times larger than the payroll of the members who transferred out, the increase of 0.01% of DBRP salaries is financed by a charge of 0.20% of the alternative program payroll.

**Amortization Test:** The current PCR, less the PCR-NCR, will be available to amortize the remaining PCR-UAL. The initial amortization period was set at 12.75 years as of July 1, 1998. The amortization period will decline by one year each biennium, but the PCR will not change unless the amortization period is more than 10 years different that the scheduled amortization period.

	Amortization of PCR-UAL		
	Baseline	Acceptable Range	
1998 Valuation	12.75	2.75	22.75
2000 Valuation	11.75	1.75	21.75
2002 Valuation	10.75	0.75	20.75
2004 Valuation	9.75	n/a *	19.75

\* Assumes immediate amortization of PCR UAL.  
Lower end only applies after 2002 if the PCR UAL is fully amortized.

**Calculation of the PCR:** The PCR, after being reduced for the PCR Normal Cost Rate, must be sufficient to amortize the PCR Unfunded Actuarial Liability over 19.75 years. If not, the PCR is increased such that the amortization period is reduced to 19.75 years.

The following table shows that the 2.17% of payroll available will amortize the PCR-UAL over a period of 20.79 years. This is outside the statutory corridor, so the PCR must be increased.

PCR – UAL as of June 30, 2004 (\$000)	\$ 13,477
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**MONTANA PUBLIC EMPLOYEES' RETIREMENT SYSTEM**  
**ACTUARIAL VALUATION AS OF JULY 1, 2004**

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PCR Available for Amortization	
Current PCR Amortization Rate	2.37%
Less, PCR – Normal Cost Rate	<u>0.20%</u>
PCR Available for Amortization	2.17%
Years to Amortize PCR – UAL from June 30, 2004	20.79 Years
Maximum Years to Amortize PCR – UAL	19.75 Years
<b>Current PCR is Not Sufficient</b>	

**Determination of Revised PCR**

PCR – Normal Cost Rate	0.20%
PCR – UAL Amortization Rate over 19.75 Years from June 30, 2004 (rounded to nearest 0.10%)	<u>2.20%</u>
<b>Revised PCR</b>	<b>2.40%</b>

The rate necessary to amortize the PCR-UAL over 19.75 years is 2.248% of the payroll of the transferred members. This rounds to 2.20% and is added to the PCR Normal Cost Rate of 0.20% to arrive at the recommended new PCR of 2.40% of payroll.

**Calculation of Contribution Rate**

The statutory funding rate is tested in the valuation to determine if it is sufficient to cover the Normal Cost Rate plus an amortization payment for the Unfunded Actuarial Liability, if any, over no more than 30 years. The calculations are shown in **TABLE 6** and summarized below.

	2004 Actuarial Valuation		2002
	Revised Assumptions	Previous Assumptions	Actuarial Valuation
Statutory Funding Rate	13.80%	13.80%	13.80%
Transfer to Education Fund	(0.04)	(0.04)	(0.04)
Normal Cost Rate	<u>(12.08)</u>	<u>(12.27)</u>	<u>(12.21)</u>
<b>Available for Amortization</b>	<b>1.68%</b>	<b>1.49%</b>	<b>1.55%</b>
Actuarial Liability of DBRP	\$ 466,798	\$ 448,724	\$ 983
Less, Funded by PCR	<u>(13,477)</u>	<u>(13,477)</u>	<u>0</u>
<b>Net UAL for DBRP Funding</b>	<b>\$ 453,321</b>	<b>\$ 435,247</b>	<b>\$ 983</b>
<b>Years to Amortize</b>	<b>Does Not Amortize</b>	<b>Does Not Amortize</b>	<b>0.1 Years</b>

Based on the current Actuarial Value of Assets and all future experience emerging as assumed, the Unfunded Actuarial Liability will not be amortized over the next 30 years. As a point of interest, we have calculated the additional revenue needed to amortize the Unfunded Actuarial Liability over 30 years.

Normal Cost Rate	12.08%
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**MONTANA PUBLIC EMPLOYEES' RETIREMENT SYSTEM**  
**ACTUARIAL VALUATION AS OF JULY 1, 2004**

---

30-Year Amortization Payment	<u>2.87</u>
<b>30-Year Contribution Rate</b>	<b>14.95%</b>
Current Statutory Rate for DBRP	13.80%
Less, Educational Fund	<u>0.04</u>
<b>Available to Fund the DBRP</b>	<b>13.76%</b>
<b>Estimated Shortfall</b>	<b>1.19%</b>

Based on the assumptions contained in this report, the a funding rate of 14.95% of payroll would be sufficient to fund the current and projected benefits from the System. The 0.04% for the Educational Fund would be in addition to this rate.

**Disclosure Information - GASB No. 25**

The disclosure of the Schedule of Funding Progress and the Solvency Test calculated in accordance with Statement No. 25 of the Governmental Accounting Standards Board are shown in **Tables 11 and 12**.

**MONTANA PUBLIC EMPLOYEES' RETIREMENT SYSTEM**  
**ACTUARIAL VALUATION AS OF JULY 1, 2004**

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**SECTION 4**  
**ACTUARIAL VALUATION RESULTS**

The following tables document the findings of the actuarial valuation.

TABLE 1	NORMAL COSTS
TABLE 2	SUMMARY OF ACTUARIAL REQUIREMENTS
TABLE 3	STATEMENT OF SYSTEM ASSETS
TABLE 4	STATEMENT OF CHANGES IN SYSTEM ASSETS
TABLE 5	ACTUARIAL VALUE OF ASSETS
TABLE 6	HISTORY OF ACTUARIAL VALUE OF ASSETS
TABLE 7	FUNDED STATUS
TABLE 8	ACTUARIAL GAINS AND LOSSES
TABLE 9	Plan Choice Rate
	A UNFUNDED ACTUARIAL LIABILITY – JUNE 30, 2003
	B UNFUNDED ACTUARIAL LIABILITY – JUNE 30, 2004
	C PLAN CHOICE RATE
TABLE 10	CALCULATION OF CONTRIBUTION RATE
TABLE 11	SCHEDULE OF FUNDING PROGRESS
TABLE 12	SOLVENCY TEST

**MONTANA PUBLIC EMPLOYEES' RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF JULY 1, 2004**

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**Table 1  
Normal Costs**

	2004 Actuarial Valuation		2002 Actuarial Valuation
	Revised Assumptions	Previous Assumptions	
<b>Normal Cost Rate</b>			
Service Retirement	9.03%	9.17%	9.09%
Disability Retirement	0.32	0.32	0.32
Death	0.53	0.57	0.56
Withdrawal	<u>2.20</u>	<u>2.21</u>	<u>2.24</u>
<b>Total Normal Cost Rate</b>	<b>12.08%</b>	<b>12.27%</b>	<b>12.21%</b>
<b>Annual Normal Cost (\$000)</b>	\$ 102,731	\$ 104,448	\$ 102,041
<b>Present Value of Future Normal Costs (\$000)</b>	<b>\$ 798,625</b>	<b>\$ 815,280</b>	<b>\$ 827,143</b>



**MONTANA PUBLIC EMPLOYEES' RETIREMENT SYSTEM**  
**ACTUARIAL VALUATION AS OF JULY 1, 2004**

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**TABLE 2**  
**SUMMARY OF ACTUARIAL REQUIREMENTS**

(\$000)	2004 Actuarial Valuation		2002
	Revised Assumptions	Previous Assumptions	Actuarial Valuation
<b>Retired Members</b>			
Service Retirement	\$ 1,338,329	\$ 1,319,756	\$ 1,107,546
Disability Retirement	60,699	58,698	47,366
Beneficiaries	<u>123,228</u>	<u>122,883</u>	<u>109,726</u>
Retired Member Total	1,522,256	1,501,337	1,264,638
<b>Inactive Members</b>	117,889	116,595	101,996
<b>Active Members</b>			
Service Retirement	2,335,525	2,346,300	2,186,212
Disability Retirement	59,117	57,313	57,559
Pre-retirement Death	115,248	123,041	116,451
Withdrawal	<u>162,675</u>	<u>166,705</u>	<u>178,051</u>
Active Member Total	2,672,565	2,693,359	2,538,273
<b>Present Value of Future Projected Benefits</b>	<b>\$ 4,312,710</b>	<b>\$ 4,311,291</b>	<b>\$ 3,904,907</b>
Present Value of Future Normal Costs	<u>798,625</u>	<u>815,280</u>	<u>827,143</u>
<b>Actuarial Liability</b>	<b>\$ 3,514,085</b>	<b>\$ 3,496,011</b>	<b>\$ 3,077,764</b>

**MONTANA PUBLIC EMPLOYEES' RETIREMENT SYSTEM**  
**ACTUARIAL VALUATION AS OF JULY 1, 2004**

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**TABLE 3**  
**STATEMENT OF SYSTEM ASSETS**

(\$000)	2004	2002
<b>Current Assets</b>		
Cash	\$ 103,039	\$ 66,066
Accounts Receivable	1,432	5,838
Interest Receivable	10,400	12,405
Other Receivable	<u>676</u>	<u>0</u>
Total Current Assets	115,547	84,309
<b>Investments, at Fair value</b>		
Mortgages and Commercial Loans	66,755	178,442
Investment Pools	2,839,515	2,116,367
Other Investments	<u>8,409</u>	<u>199,528</u>
Total Investments	2,914,679	2,494,337
Securities Lending Collateral	141,311	127,173
Other Assets:	<u>537</u>	<u>2</u>
<b>Total Assets</b>	<b>\$ 3,172,074</b>	<b>\$ 2,705,821</b>
<b>Liabilities</b>		
Accounts Payable	\$ 351	\$ 13,911
Securities Lending Liability	141,311	127,173
Compensated Absences	237	226
Other	<u>265</u>	<u>13</u>
<b>Total Liabilities</b>	<b>\$ 142,164</b>	<b>\$ 141,323</b>
<b>Net System Assets</b>	<b>\$ 3,029,910</b>	<b>\$ 2,564,498</b>

**MONTANA PUBLIC EMPLOYEES' RETIREMENT SYSTEM**  
**ACTUARIAL VALUATION AS OF JULY 1, 2004**

**TABLE 4**  
**STATEMENT OF CHANGES IN SYSTEM ASSETS**

(\$000)	2004	2003
<b>Contributions</b>		
Employer	\$ 57,453	\$ 56,882
Plan Member	61,911	61,750
Other	<u>1,585</u>	<u>1,640</u>
Total Contributions	120,949	120,272
<b>Investments Income</b>		
Net Appreciation/(Depreciation) In fair value of investments	203,084	53,193
Investment Earnings	<u>160,659</u>	<u>117,220</u>
Total Investment Income	363,743	170,413
Less Investment Expense	<u>(3,761)</u>	<u>(3,402)</u>
Net Investment Income	359,982	167,011
Securities Lending Income	1,487	1,629
Less Securities Lending Expense	<u>(1,211)</u>	<u>(1,319)</u>
Net Securities Lending Income	276	310
Total Net Investment Income after SLI	360,258	167,321
<b>Total Additions</b>	<b>\$ 481,207</b>	<b>\$ 287,593</b>
<b>Benefits and Expenses</b>		
Benefit Payments	\$ 132,683	\$ 122,204
Refunds to Members	10,913	10,218
Refunds to Other Plans	398	228
Transfers to DCRP	1,295	15,991
Transfers to ORP	189	5,957
Administrative Expense	<u>2,415</u>	<u>1,670</u>
<b>Total Deductions</b>	<b>147,893</b>	<b>156,268</b>
<b>Accounting Adjustments</b>	<b>772</b>	<b>1</b>
<b>Net Increase in System Assets</b>	<b>\$ 334,086</b>	<b>\$ 131,326</b>
<b>Net System Assets</b>		
Beginning of the Year	\$ 2,695,824	\$ 2,564,498
End of the Year	\$ 3,029,910	\$ 2,695,824

**MONTANA PUBLIC EMPLOYEES' RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF JULY 1, 2004**

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**TABLE 5  
ACTUARIAL VALUE OF ASSETS**

(\$000)

Fiscal Year	Cash Flow	Expected Value	Gain or (Loss)	Market Value
2000-01				\$ 2,777,338
2001-02	\$ (9,613)	\$ 2,989,527	\$ (425,030)	2,564,498
2002-03	(34,326)	2,733,958	(38,134)	2,695,824
2003-04	(24,529)	2,885,980	143,930	3,029,910

Fiscal Year	Gain or (Loss)	Reserve Factor	Smoothing Reserve
2001-02	\$ (425,030)	25%	\$ (106,257)
2002-03	(38,134)	50%	(19,067)
2003-04	143,930	75%	<u>107,947</u>
			\$ (17,377)

<b>Fair Market Value on June 30, 2004</b>	<b>\$ 3,029,910</b>
<b>Less, Asset Smoothing Reserve</b>	<u>17,377</u>
<b>Actuarial Value of Assets on June 30, 2004</b>	<b>\$ 3,047,287</b>

**MONTANA PUBLIC EMPLOYEES' RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF JULY 1, 2004**

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**TABLE 6  
HISTORY OF ACTUARIAL VALUE OF ASSETS**

(\$000) June 30	Market Value		Actuarial Value <sup>(1)</sup>		Ratio of Actuarial to Market
	(\$000)	<i>Estimated Return</i> <sup>(2)</sup>	(\$000)	<i>Estimated Return</i> <sup>(2)</sup>	
2000	\$ 2,935,779		\$ 2,843,347		97%
2001	2,777,338	(5.1)%	3,043,751	7.3%	110%
2002	2,564,498	(7.3)%	3,076,781	1.4%	120%
2003	2,695,824	6.5%	3,033,210	(0.3)%	113%
2004	3,029,910	13.4%	3,047,287	1.3%	101%

Note:

<sup>(1)</sup> Asset Method adopted for 2000 valuation with retroactive calculation to July 1, 1997

<sup>(2)</sup> Estimated returns are net of all investment and administrative expenses paid by the System and assuming uniform cash flow throughout the year

**MONTANA PUBLIC EMPLOYEES' RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF JULY 1, 2004**

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**TABLE 7  
FUNDED STATUS**

(\$000)	2004 Actuarial Valuation		2002 Actuarial Valuation
	Revised Assumptions	Previous Assumptions	
<b>Actuarial Value of Assets</b>			
Actuarial Liability	\$ 3,514,085	\$ 3,496,011	\$ 3,077,764
Actuarial Value of Assets	<u>3,047,287</u>	<u>3,047,287</u>	<u>3,076,781</u>
Unfunded Actuarial Liability	\$ 466,798	\$ 448,724	\$ 983
<b>Funded Ratio (AVA)</b>	<b>87%</b>	<b>87%</b>	<b>100%</b>
<b>Market Value of Assets</b>			
Actuarial Liability	\$ 3,514,085	\$ 3,496,011	\$ 3,077,764
Market Value of Assets	<u>3,029,910</u>	<u>3,029,910</u>	<u>2,564,498</u>
Unfunded Actuarial Liability	\$ 484,175	\$ 466,101	\$ 513,266
<b>Funded Ratio (MVA)</b>	<b>86%</b>	<b>87%</b>	<b>83%</b>

**MONTANA PUBLIC EMPLOYEES' RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF JULY 1, 2004**

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**TABLE 8  
ACTUARIAL GAINS AND LOSSES**

(\$000)	Expected	Actual	(Gain) or Loss
<b>2002 Actuarial Liability</b>	\$ 3,077,764		
Normal Costs	208,674		
Benefits Paid	(299,450)		
Expected Earnings at 8%	<u>504,155</u>		
<b>Actuarial Liability at June 30, 2004</b>	\$ 3,491,143	\$ 3,514,085	\$ 22,942
<b>2002 Actuarial Value of Assets</b>	\$ 3,076,781		
Net Cash Flow	(58,855)		
Expected Earnings at 8%	<u>506,766</u>		
<b>Actuarial Value of Assets</b>	\$ 3,524,692	3,047,287	477,405
<b>Unfunded Actuarial Liability as of June 30, 2004</b>	\$ (33,549)	\$ 466,798	\$ 500,347
<b>Summary Actuarial (Gain) or Loss by Source</b>			
Investment (Gain) or Loss			\$ 477,405
Liability (Gain) or Loss			4,867
Revised Actuarial Assumptions			<u>18,075</u>
<b>Total Actuarial (Gain) or Loss</b>			<b>\$ 500,347</b>

**MONTANA PUBLIC EMPLOYEES' RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF JULY 1, 2004**

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**TABLE 9-A  
PLAN CHOICE RATE UNFUNDED ACTUARIAL LIABILITY – JUNE 30, 2003**

(\$000)

**Calculation of Expected Unfunded  
Actuarial Liability as of June 30, 2003**

Actuarial Liability as of June 30, 2002	\$ 3,077,764
Normal Cost for 2002-03	102,041
Benefits Paid for 2002-03	(154,369)
Assumed Interest at 8% per year	<u>244,127</u>
Expected Actuarial Liability at June 30, 2003	\$ 3,269,563
Actuarial Value of Assets	<u>3,033,210</u>
Estimated Unfunded Actuarial Liability at June 30, 2003	\$ 236,353

**Allocation of Estimated Unfunded  
Actuarial Liability as of June 30, 2003**

	<u>Annualized Payroll</u>	<u>Allocation Percentage</u>	<u>Allocated UAL</u>
Total	\$ 856,239	100.00%	\$ 236,353
DBRP	<u>819,119</u>	<u>95.66%</u>	<u>226,107</u>
DBRP & ORP	\$ 37,120	4.34%	\$ 10,246

**Actuarial (Gain) or Loss on Transfers from DBRP**

	<u>DCRP &amp; ORP</u>
Actuarial Liability for Transferees as of June 30, 2002	\$ 21,860
Normal Cost for 2002-03	4,428
Assumed Interest at 8% per year	<u>1,922</u>
Expected Actuarial Liability at June 30, 2003	\$ 28,210
Total Asset Transfers with 8% Assumed Earnings to June 30, 2003	<u>23,829</u>
Actuarial (Gain) or Loss on Transfers at June 30, 2003	\$ (4,381)

**Adjusted PCR - UAL as of June 30, 2003**

Allocated Unfunded Actuarial Liability	\$ 10,246
Actuarial (Gain) or Loss on Transfers	(4,381)
Less, PCR Contributions to DBRP during 2002-03	(565)
Less, Interest at 8% on PCR Contributions to DBRP during 2002-03	<u>(14)</u>
Adjusted PCR - UAL as of June 30, 2003	\$ 5,286



**MONTANA PUBLIC EMPLOYEES' RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF JULY 1, 2004**

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**TABLE 9-B  
PLAN CHOICE RATE UNFUNDED ACTUARIAL LIABILITY – JUNE 30, 2004**

(\$000)

**PCR – UAL Calculations for 2003-04**

PCR - UAL as of June 30, 2003 (Table 9-A)	\$	5,286
Assumed Interest at 8% per year		423
Less, PCR Contributions to DBRP during 2003-04		(1,368)
Less, Interest at 8% on PCR Contributions to DBRP during 2003-04		(57)
Recognition of Prior Investment (Gain) or Loss		
2000-01 Balance	\$ 96,270	100% x 4.34% 4,174
2001-02 Balance	\$ 212,515	50% x 4.34% 4,606
2002-03 Balance	\$ 28,601	33% x 4.34% <u>413</u>
		9,193
<b>PCR - Unfunded Actuarial Liability at June 30, 2004</b>	<b>\$</b>	<b>13,477</b>

**MONTANA PUBLIC EMPLOYEES' RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF JULY 1, 2004**

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**TABLE 9-C  
PLAN CHOICE RATE**

(\$000)

**PCR - Normal Cost Rate**

Normal Cost Rate		
DBRP Members Only	12.08%	
Including DCRP and ORP Members	<u>12.07%</u>	
Difference	(A)	0.01%
Payroll as of June 30, 2004 (\$000)		
DBRP Members Only	(B)	\$ 854,944
DCRP and ORP Members	(C)	\$ 42,175
PCR – Normal Cost Rate	(A) x (B) ÷ (C)	0.20%

**PCR – UAL Amortization**

PCR – UAL as of June 30, 2004 (Table 9-B)	\$	13,477
PCR Available for Amortization		
Current PCR Amortization Rate		2.37%
Less, PCR – Normal Cost Rate		<u>0.20%</u>
PCR Available for Amortization		2.17%
Years to Amortize PCR – UAL from June 30, 2004		20.79 Years
Maximum Years to Amortize PCR – UAL from June 30, 2004		19.75 Years

**Current PCR is Not Sufficient**

**Determination of Revised PCR**

PCR – Normal Cost Rate	0.20%
PCR – UAL Amortization Rate over 19.75 Years from June 30, 2004 (rounded to nearest 0.10%)	<u>2.20%</u>
<b>Revised PCR</b>	<b>2.40%</b>

**MONTANA PUBLIC EMPLOYEES' RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF JULY 1, 2004**

**TABLE 10  
CALCULATION OF CONTRIBUTION RATE**

	2004 Actuarial Valuation		2002
	Revised Assumptions	Previous Assumptions	Actuarial Valuation
<b>Statutory Funding Rate</b>			
Members	6.90%	6.90%	6.90%
Employers	6.80%	6.80%	6.80%
State	<u>0.10%</u>	<u>0.10%</u>	<u>0.10%</u>
Total	13.80%	13.80%	13.80%
<b>Transfer to Education Fund</b>	<u>(0.04)%</u>	<u>(0.04)%</u>	<u>(0.04)%</u>
<b>Net Contribution to DBRP</b>	13.76%	13.76%	13.76%
<b>Normal Cost Rate</b>	12.08%	12.27%	12.21%
<b>Funding Rate Available for Amortization</b>	1.68%	1.49%	1.55%
<b>(\$000)</b>			
<b>Unfunded Actuarial Liability</b>			
DBRP (Table 7)	\$ 466,798	\$ 448,724	\$ 983
Less, PCR-UAL Funded by DCRP & ORP (Table 9-B)	<u>(13,477)</u>	<u>(13,477)</u>	<u>0</u>
Funded by DBRP	\$ 453,321	\$ 435,247	\$ 983
Years to Amortize	Does Not Amortize	Does Not Amortize	0.1 Years
<b>Calculated Contribution Rate</b>			
Normal Cost Rate	12.08%	12.27%	12.21%
Amortization Payment Available	1.68%	1.49%	1.55%
Additional Contribution for 30-year Amortization	<u>1.19%</u>	<u>1.18%</u>	<u>0.00%</u>
Total Amortization	2.87%	2.67%	1.55%
<b>Total Calculated Rate</b>	<b>14.95%</b>	<b>14.94%</b>	<b>13.76%</b>

**MONTANA PUBLIC EMPLOYEES' RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF JULY 1, 2004**

**DISCLOSURE INFORMATION - GASB No. 25**

**TABLE 11**

**SCHEDULE OF FUNDING PROGRESS  
(DOLLARS IN THOUSANDS)**

Actuarial Valuation Date	Actuarial Value of Assets	Actuarial Accrued Liability (AAL)	Funded Ratio	Unfunded AAL (UAAL)	Covered Payroll	UAAL as a Percentage of Covered Payroll
June 30, 1994	\$1,366,864	\$1,625,720	84%	\$258,856	\$572,973	45%
June 30, 1996	1,629,707	1,826,207	89	196,500	608,592	32
June 30, 1998	2,113,314	2,298,702	92	185,388	660,579	28
June 30, 2000	2,843,347	2,273,407	125	(569,940)	725,692	(79)
June 30, 2002	3,076,781	3,077,764	100	983	808,747	0
June 30, 2004	3,047,287	3,514,085	87	466,798	832,847	56

**TABLE 12**

**SOLVENCY TEST  
(DOLLARS IN THOUSANDS)**

Actuarial Valuation Date	(1) Active Member Accounts	(2) Inactive Actuarial Liability	(3) Employer Financed Active Liability	Actuarial Value of Assets	Coverage Ratios		
					(1)	(2)	(3)
June 30, 1994	\$255,261	\$743,551	\$626,908	\$1,366,864	100%	100%	59%
June 30, 1996	307,369	768,950	749,888	1,629,706	100	100	74
June 30, 1998	360,422	949,365	988,915	2,113,314	100	100	81
June 30, 2000	572,536 <sup>(1)</sup>	1,049,012	651,859	2,843,347	100	100	187
June 30, 2002	645,403	1,366,634	1,065,727	3,076,781	100	100	100
June 30, 2004	684,607	1,640,145	1,189,333	3,047,287	100	100	61

**Note:**

<sup>(1)</sup> Prior to 2000, "active member accounts" included Regular Contributions without interest for active and inactive members. Beginning in 2000, "active member accounts" includes Regular and Additional Contributions with interest, and excludes all accounts of inactive members.

**MONTANA PUBLIC EMPLOYEES' RETIREMENT SYSTEM**  
**ACTUARIAL VALUATION AS OF JULY 1, 2004**

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**Appendix A**

**Actuarial Methods and Assumptions**

This section of the report describes the actuarial methods and assumptions used in this valuation. These methods and assumptions have been chosen by the Retirement Board based on our recommendations. The Retirement Board has the sole authority to select the methods and assumptions used in this actuarial valuation. The recommendations were formed on the basis of recent experience of the System and on current expectations as to future economic conditions.

The assumptions are intended to estimate the future experience of the System and the members of the System in areas which affect the projected benefit flow and anticipated investment earnings. Any variations in future experience from that expected from these assumptions will result in corresponding changes in the estimated costs of the System's benefits.

In our opinion, the current actuarial methods and assumptions are reasonable and appropriate for this System. The assumptions were developed in accordance with generally recognized and accepted actuarial principles and practices that are consistent with applicable Standards of Practice adopted by the American Academy of Actuaries.

**Records and Data**

The data used in the valuation consist of financial information and records of age, service, account balances, benefits in pay status and income of contributing members, former contributing members and their survivors. All of the data were supplied by the System and are accepted for valuation purposes without audit.

**Actuarial Cost Method**

A fundamental principle in financing the liabilities of a retirement program is that the cost of its benefits should be related to when they are earned, rather than when they are paid. There are a number of methods in use for making a determination.

The funding method used in this valuation is the Entry Age Cost Method. Under this method the actuarial present value of projected benefits for each individual member included in the valuation is allocated on a level basis over the earnings of the individual between entry age and assumed exit ages. The portion of this actuarial present value allocated to a valuation year is called the Normal Cost. The portion of this actuarial present value not provided for at a valuation date by the actuarial present value of future Normal Costs is called the Actuarial Liability.

The excess of the Actuarial Liability over the Actuarial Value of Assets is called the Unfunded Actuarial Liability. If the Actuarial Value of Assets exceeds the Actuarial Liability, the difference is called the Actuarial Surplus.

**MONTANA PUBLIC EMPLOYEES' RETIREMENT SYSTEM**  
**ACTUARIAL VALUATION AS OF JULY 1, 2004**

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**Asset Valuation Method**

Asset values were supplied by the System and were accepted without audit by us. The Actuarial Value of Assets is the market value, adjusted by a four-year recognition of gains and losses.

**Investment Return**

The future investment earnings of the assets of the plan are assumed to accrue at a net annual rate of 8.00%, net of all administrative and investment-related expenses.

**Interest on Member Contributions**

Interest on member contributions is assumed to accrue at a net annual rate of 5.00%.

**Future Salaries**

Estimates of future salaries are based on two types of assumptions. Rates of increase in the general wage level of the membership are directly related to inflation, while individual salary changes due to promotion and longevity, referred to as the merit scale, occur even in the absence of inflation. The assumed increase in future salaries due to general wage growth is 4.25% per year. The merit scale, assumed in addition to general wage growth, is shown in Table A-2.

**Service Retirement**

The assumed rates of retirement used in this valuation are shown in Table A-3.

All vested terminated members are assumed to retire when first eligible for an unreduced benefit.

**Disablement**

The assumed rates of disablement are illustrated in Table A-4 at specified ages. We also assume that all disabilities are permanent, and no disabled member will recover and return to work.

**Mortality**

The probabilities of mortality are based on the following published tables:

Healthy Retirees, Beneficiaries and Non-Retired Members

Males 1994 Male Uninsured Pensioner Table (-1)

Females 1994 Female Uninsured Pensioner Table (-1)

Disabled Retirees

Males IRS Revenue Ruling 96-7 Male Table (-3)

Females IRS Revenue Ruling 96-7 Female Table (+1)

These rates are illustrated in Table A-5.

**MONTANA PUBLIC EMPLOYEES' RETIREMENT SYSTEM**  
**ACTUARIAL VALUATION AS OF JULY 1, 2004**

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**Other Terminations of Employment**

The assumed rates of termination, other than for retirement, death, or disability, are shown in Table A-6.

**Benefits for Terminating Members**

The probability of a terminating member electing a refund of the member account balance is shown in Table A-7.

**Changes in Actuarial Assumptions Made for this Valuation**

Please refer to the 2003 Experience Study dated September 23, 2004 for further information on the revisions made to the actuarial assumptions. The following method and assumptions were revised since the last valuation:

**Actuarial Methods**

- ◆ None

**Economic Assumptions**

- ◆ General Wage Increases from 4.50% to 4.25% per year

**Demographic Assumptions**

- ◆ Healthy Male mortality rates
- ◆ Disabled Male & Female mortality rates
- ◆ Rates of service retirement for active members with under 30 Years of Service
- ◆ Probability of refund for terminating member

**MONTANA PUBLIC EMPLOYEES' RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF JULY 1, 2004**

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**Table A-1**

**Summary of Valuation Assumptions  
(July 1, 2004)**

I. Economic assumptions	
A. General wage increases	4.25%
B. Investment return	8.00%
C. Interest on member accounts	5.00%
II. Demographic assumptions	
A. Individual salary increase due to promotion and longevity	Table A-2
B. Retirement	Table A-3
C. Disablement	Table A-4
D. Mortality among contributing members, service retired members, and beneficiaries	Table A-5
1994 Uninsured Pensioner Mortality Table, with ages set back 1 year for males and ages set back 1 year for females	
E. Mortality among disabled members	Table A-5
Based on the IRS Social Security Disabled Mortality Tables published in Revenue Ruling 96-7 for pre-1995 disabilities with ages set back 3 years for males and set forward 1 year for females.	
F. Other terminations of employment	Table A-6
G. Probability of retaining membership in the System upon vested termination	Table A-7



**MONTANA PUBLIC EMPLOYEES' RETIREMENT SYSTEM**  
**ACTUARIAL VALUATION AS OF JULY 1, 2004**

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**Table A-2**

**Merit Salary Increases**

<u>Service</u>	<u>Annual Increase</u>
1	6.00%
2	4.90
3	3.90
4	3.10
5	2.40
6	1.80
7	1.40
8	1.00
9	0.70
10	0.50
11-15	0.30
16-20	0.10
21 & over	0.00

**MONTANA PUBLIC EMPLOYEES' RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF JULY 1, 2004**

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**Table A-3**

**Retirement  
Annual Rates**

Age	< 30 Yrs	w/ 30 Yrs	Age	< 30 Yrs	w/ 30 Yrs
Under 50	-	10%	61	15%	15%
			62	25	25
50 - 54	3%	10	63	15	15
			64	15	15
55	3	15	65	30	30
56	4	15	66	30	30
57	5	15	67	25	25
58	5	15	68	25	25
59	6	15	69	25	25
60	8	15	70 & over	100	100

**MONTANA PUBLIC EMPLOYEES' RETIREMENT SYSTEM**  
**ACTUARIAL VALUATION AS OF JULY 1, 2004**

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**Table A-4**

**Disablement**  
**Annual Rates**

<u>Age</u>	<u>Male</u>	<u>Female</u>
22	-	-
27	0.01%	0.01%
32	0.01	0.01
37	0.06	0.03
42	0.09	0.15
47	0.17	0.15
52	0.36	0.30
57	0.62	0.36
62	0.00	0.00

**MONTANA PUBLIC EMPLOYEES' RETIREMENT SYSTEM**  
**ACTUARIAL VALUATION AS OF JULY 1, 2004**

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**Table A-5**

**Mortality**  
**Annual Rates**

Age	Healthy Members		Disabled Retirees	
	Male	Female	Male	Female
50	0.250%	0.141%	2.085%	1.697%
55	0.428	0.224	2.587	1.976
60	0.762	0.415	3.194	2.344
65	1.391	0.819	3.933	2.828
70	2.336	1.367	4.900	3.492
75	3.661	2.192	6.468	4.710
80	6.007	3.802	8.522	6.346
85	9.636	6.557	10.971	9.015
90	14.995	11.247	14.405	13.322
95	23.194	18.352	19.372	20.176

**MONTANA PUBLIC EMPLOYEES' RETIREMENT SYSTEM**  
**ACTUARIAL VALUATION AS OF JULY 1, 2004**

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**Table A-6**

**Other Terminations of Employment**  
**Annual Rates**

Service	Male Members			Female Members		
	Age <30	30-39	Age>40	Age <30	30-39	Age>40
0	30%	22%	15%	30%	22%	18%
1	25	15	12	25	16	13
2	16	12	10	16	14	10
3	14	10	8	14	11	9
4	10	8	6	10	8	8
5-9	6	6	5 *	5	5	5 *
10-14	3	3	3 *	4	4	3 *
15 & over	-	2	2 *	-	2	2 *

\* No other terminations of employment are assumed after attainment of age 55 with 5 years of service.

**MONTANA PUBLIC EMPLOYEES' RETIREMENT SYSTEM**  
**ACTUARIAL VALUATION AS OF JULY 1, 2004**

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**Table A-7**

**Probability of Electing a Refund  
of Member Contributions Upon Termination**

Age at Termination	Non-Vested	Vested
Under 35	100%	50%
35 - 39	100	40
40 - 44	100	40
45 - 49	100	35
50 & over	100	30

**MONTANA PUBLIC EMPLOYEES' RETIREMENT SYSTEM**  
**ACTUARIAL VALUATION AS OF JULY 1, 2004**

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**Appendix B**

**Provisions of Governing Law**

All of the calculations contained in this report are based on our understanding of the benefit and eligibility provisions of the system. The provisions used in this valuation are summarized below for reference purposes.

<b>Normal Retirement</b>	Eligibility:	Age 65 regardless of membership service, or Age 60 and 5 years of membership service, or 30 years of membership service regardless of age.
	Benefit:	Years of service credit, multiplied by highest average compensation (highest 36 consecutive months), multiplied by $1/56^{\text{th}}$ if membership service at retirement is less than 25 years, or multiplied by $1/50^{\text{th}}$ if membership service at retirement is at least 25 years.
	Normal Form:	Monthly benefit for the life of the member, with a death benefit equal to the remaining balance of the member's contribution account.
<b>Early Retirement</b>	Eligibility:	Age 50 and 5 years of membership service, or 25 years of membership service regardless of age.
	Benefit:	Actuarial equivalent of the accrued benefit based on retirement at age 60 or 30 years of membership service.
<b>Disability Retirement</b>	Eligibility:	5 years of membership service
	Benefit:	If hired on or before February 24, 1991, the greater of (a) and (b) below: (a) Years of service credit, multiplied by highest average compensation, multiplied by 90% of $1/56^{\text{th}}$ ( $1/50^{\text{th}}$ if 25 or more years of membership service), or (b) Highest average compensation multiplied by 25%.  If hired after February 24, 1991: (a) Years of service credit, multiplied by highest average compensation, multiplied by $1/56^{\text{th}}$ ( $1/50^{\text{th}}$ if 25 or more years of membership service).

**MONTANA PUBLIC EMPLOYEES' RETIREMENT SYSTEM**  
**ACTUARIAL VALUATION AS OF JULY 1, 2004**

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<b>Death before Retirement</b>	Eligibility:	Prior to 5 years of membership service
	Benefit:	The sum of (a) and (b) below: (a) Return of member contributions with interest, (b) Lump sum payment of one month's salary up to a maximum of six months' salary.
	Eligibility:	5 years of membership service
	Benefit:	Either the sum of (a) and (b), or (c) below: (a) Return of member contributions with interest, and (b) Lump sum payment of one month's salary up to a maximum of six months' salary, or (c) Actuarial equivalent of the accrued benefit at the time of death of the member.
<b>Termination Benefit</b>	Eligibility:	Prior to 5 years of membership service
	Benefit:	Return of member contributions with interest.
	Eligibility:	5 years of membership service
	Benefit:	Either (a) or (b) below: (a) Return of member contributions with interest, or (b) Actuarial equivalent of the accrued benefit based on a retirement age of 60.
<b>Benefit Adjustments</b>	Eligibility:	Retired members and beneficiaries.
	Benefit:	An annual adjustment (GABA) of 3.0% commencing January 1 <sup>st</sup> , one year after retirement.
<b>Contributions</b>	Members:	6.90% of members' compensation
	Employers:	6.90% of members' compensation (offset by 0.10% of members' compensation paid by the State for local government and school district employers).



**MONTANA PUBLIC EMPLOYEES' RETIREMENT SYSTEM**  
**ACTUARIAL VALUATION AS OF JULY 1, 2004**

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**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. Values shown in the tables are the numbers of members and their total and average annual salaries.

Active Members	Annual Salaries in Millions	Average Annual Salary
28,201	\$831.6	\$29,487

Table C-2 presents distributions of the following:

- Members receiving service retirement benefits.
- Members receiving disability retirement benefits.
- Survivors of deceased members receiving benefits.
- Terminated vested members.

Type of Annuitant	Number	Annual Benefits in Thousands	Average Annual Benefits
Service Retirement	12,223	\$ 116,281	\$ 9,513
Disability Retirement	797	5,578	7,000
Survivors of Deceased Members	1,814	13,348	7,358
Total Annuitants	14,834	\$ 135,207	\$ 9,115

Terminated Members	Number
Vested Terminated Members	2,362
Non-Vested Terminated Members	9,132
Total Terminated Members	11,494

**MONTANA PUBLIC EMPLOYEES' RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF JULY 1, 2004**

**Table C-1**

**Active Members Distribution of  
Members and Salaries**

as of July 1, 2004

**Number of Members – By Age Group – DBRP Members**

Completed Years of Service

Age	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+	Totals
< 25	328	118	66	33	4	-	-	-	-	-	-	-	549
25 to 29	495	295	185	273	114	1	-	-	-	-	-	-	1,363
30 to 34	433	273	221	347	431	79	2	-	-	-	-	-	1,786
35 to 39	615	287	229	378	571	366	97	2	1	-	-	-	2,546
40 to 44	481	350	333	543	860	720	397	196	12	1	-	-	3,893
45 to 49	524	353	351	596	1,087	906	609	473	276	24	3	-	5,202
50 to 54	428	296	292	547	1,044	927	750	588	532	198	22	4	5,628
55 to 59	266	229	194	390	724	730	593	435	392	243	72	16	4,284
60 to 64	117	97	102	193	375	376	311	263	183	82	50	18	2,167
65 to 69	36	40	30	59	113	97	57	63	25	16	6	8	550
70 and up	21	27	18	26	39	39	24	20	10	3	3	3	233
Totals	3,744	2,365	2,021	3,385	5,362	4,241	2,840	2,040	1,431	567	156	49	28,201

**MONTANA PUBLIC EMPLOYEES' RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF JULY 1, 2004**

**Table C-1**

**Active Members Distribution of  
Members and Salaries**

**as of July 1, 2004**

**Annual Salaries in Thousands – By Age Group – DBRP Members**

Completed Years of Service

Age	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+	Totals
< 25	6,423	2,483	1,383	739	100	-	-	-	-	-	-	-	11,128
25 to 29	11,319	7,175	4,675	7,589	3,384	49	-	-	-	-	-	-	34,191
30 to 34	10,264	6,548	6,023	10,034	14,278	2,767	74	-	-	-	-	-	49,988
35 to 39	13,414	6,434	5,986	10,303	18,045	13,538	3,666	65	25	-	-	-	71,476
40 to 44	10,455	7,289	7,620	14,099	26,170	25,639	15,302	7,686	505	40	-	-	114,805
45 to 49	11,362	7,360	7,885	14,731	31,236	30,478	23,007	19,791	11,601	1,004	109	-	158,564
50 to 54	9,643	6,259	6,660	13,488	29,437	29,366	26,786	23,567	23,212	9,215	915	180	178,728
55 to 59	5,704	4,803	4,390	9,153	19,550	22,139	19,945	15,871	16,101	11,152	3,217	789	132,814
60 to 64	2,134	1,812	2,025	4,834	9,464	10,811	9,409	8,488	6,691	3,283	2,261	796	62,008
65 to 69	544	767	594	1,016	2,394	2,505	1,665	1,789	834	711	227	322	13,368
70 and up	309	332	224	378	528	895	622	551	287	106	109	153	4,494
Totals	81,571	51,262	47,465	86,364	154,586	138,187	100,476	77,808	59,256	25,511	6,838	2,240	831,564

**MONTANA PUBLIC EMPLOYEES' RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF JULY 1, 2004**

**Table C-1**

**Active Members Distribution of  
Members and Salaries**

as of July 1, 2004

**Average Annual Salary – By Age Group – DBRP Members**

Age	<u>Completed Years of Service</u>												Average	
	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	19,584	21,041	20,959	22,406	24,916	-	-	-	-	-	-	-	-	20,271
25 to 29	22,868	24,321	25,269	27,800	29,689	48,611	-	-	-	-	-	-	-	25,085
30 to 34	23,705	23,987	27,253	28,916	33,127	35,025	37,205	-	-	-	-	-	-	27,989
35 to 39	21,812	22,419	26,142	27,257	31,602	36,989	37,789	32,510	25,004	-	-	-	-	28,074
40 to 44	21,737	20,826	22,883	25,966	30,430	35,609	38,544	39,213	42,065	40,211	-	-	-	29,490
45 to 49	21,684	20,850	22,464	24,716	28,736	33,641	37,778	41,842	42,033	41,836	36,365	-	-	30,481
50 to 54	22,530	21,145	22,807	24,659	28,196	31,679	35,714	40,080	43,631	46,539	41,584	44,876	-	31,757
55 to 59	21,443	20,974	22,630	23,468	27,003	30,327	33,635	36,485	41,073	45,891	44,686	49,323	-	31,002
60 to 64	18,241	18,684	19,850	25,049	25,237	28,754	30,253	32,275	36,563	40,038	45,218	44,198	-	28,615
65 to 69	15,108	19,175	19,801	17,214	21,190	25,826	29,209	28,394	33,346	44,407	37,883	40,259	-	24,304
70 and up	14,738	12,311	12,456	14,531	13,550	22,946	25,927	27,536	28,740	35,319	36,230	51,103	-	19,294
Totals	21,788	21,676	23,486	25,514	28,830	32,584	35,379	38,141	41,408	44,991	43,835	45,706	-	29,487

**MONTANA PUBLIC EMPLOYEES' RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF JULY 1, 2004**

**Table C-1**

**Active Members Distribution of  
Members and Salaries**

**as of July 1, 2004**

**Number of Members – By Age Group – DCRP & ORP Members**

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	12	11	4	3	-	-	-	-	-	-	-	-	-	30
25 to 29	25	55	44	52	13	-	-	-	-	-	-	-	-	189
30 to 34	32	47	38	57	79	3	-	-	-	-	-	-	-	256
35 to 39	23	39	35	50	58	15	1	-	-	-	-	-	-	221
40 to 44	21	27	40	50	72	27	10	-	-	-	-	-	-	247
45 to 49	27	42	31	34	64	23	9	1	3	-	-	-	-	234
50 to 54	12	14	15	28	42	21	4	4	1	-	-	-	-	141
55 to 59	8	23	7	14	12	4	-	-	-	-	-	-	-	68
60 to 64	7	3	5	5	2	3	-	-	-	-	-	-	-	25
65 to 69	1	1	-	3	1	-	-	-	-	-	-	-	-	6
70 and up	-	-	-	1	-	-	-	-	-	-	-	-	-	1
<b>Totals</b>	<b>168</b>	<b>262</b>	<b>219</b>	<b>297</b>	<b>343</b>	<b>96</b>	<b>24</b>	<b>5</b>	<b>4</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>1,418</b>

**MONTANA PUBLIC EMPLOYEES' RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF JULY 1, 2004**

**Table C-1**

**Active Members Distribution of  
Members and Salaries**

**as of July 1, 2004**

**Annual Salaries in Thousands – By Age Group – DCRP & ORP Members**

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	268	267	120	67	-	-	-	-	-	-	-	-	722
25 to 29	601	1,371	1,200	1,620	391	-	-	-	-	-	-	-	5,183
30 to 34	938	1,295	1,110	1,770	2,884	99	-	-	-	-	-	-	8,096
35 to 39	499	1,135	989	1,556	2,207	525	24	-	-	-	-	-	6,935
40 to 44	486	567	1,112	1,477	2,365	949	277	-	-	-	-	-	7,233
45 to 49	676	1,049	869	865	2,055	776	314	14	87	-	-	-	6,705
50 to 54	274	287	408	746	1,063	529	124	134	42	-	-	-	3,607
55 to 59	143	607	181	303	326	58	-	-	-	-	-	-	1,618
60 to 64	141	103	118	81	29	76	-	-	-	-	-	-	548
65 to 69	12	13	-	33	8	-	-	-	-	-	-	-	66
70 and up	-	-	-	9	-	-	-	-	-	-	-	-	9
Totals	4,038	6,694	6,107	8,527	11,328	3,012	739	148	129	-	-	-	40,722

**MONTANA PUBLIC EMPLOYEES' RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF JULY 1, 2004**

**Table C-1**

**Active Members Distribution of  
Members and Salaries**

**as of July 1, 2004**

**Average Annual Salary – By Age Group – DCRP & ORP Members**

Age	<u>Completed Years of Service</u>												Average	
	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	22,356	24,313	30,058	22,278	-	-	-	-	-	-	-	-	-	24,093
25 to 29	24,024	24,931	27,266	31,163	30,058	-	-	-	-	-	-	-	-	27,422
30 to 34	29,315	27,561	29,197	31,056	36,510	32,976	-	-	-	-	-	-	-	31,627
35 to 39	21,676	29,115	28,260	31,129	38,044	35,020	23,632	-	-	-	-	-	-	31,380
40 to 44	23,138	20,985	27,806	29,550	32,846	35,156	27,705	-	-	-	-	-	-	29,285
45 to 49	25,029	24,978	28,040	25,450	32,108	33,756	34,932	14,233	28,886	-	-	-	-	28,658
50 to 54	22,796	20,494	27,227	26,657	25,315	25,194	30,888	33,497	41,513	-	-	-	-	25,579
55 to 59	17,871	26,372	25,867	21,636	27,147	14,478	-	-	-	-	-	-	-	23,782
60 to 64	20,119	34,261	23,504	16,151	14,354	25,490	-	-	-	-	-	-	-	21,883
65 to 69	11,625	13,455	-	11,139	7,666	-	-	-	-	-	-	-	-	11,027
70 and up	-	-	-	9,156	-	-	-	-	-	-	-	-	-	9,156
Totals	24,025	25,553	27,886	28,718	33,023	31,388	30,776	29,644	32,043	-	-	-	-	28,718

**MONTANA PUBLIC EMPLOYEES' RETIREMENT SYSTEM**  
**ACTUARIAL VALUATION AS OF JULY 1, 2004**

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**Table C-2**

**Distribution of Inactive Lives**

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

Age	Number of Persons	Annual Benefit in Thousands	Average Annual Benefits
< 50	29	636	21,945
50 to 54	319	5,173	16,216
55 to 59	881	13,218	15,003
60 to 64	1,745	20,583	11,795
65 to 69	2,404	23,915	9,948
70 to 74	2,193	18,984	8,656
75 to 79	1,913	14,849	7,762
80 to 84	1,437	10,150	7,063
85 to 89	899	5,948	6,616
90 and up	403	2,825	7,011
Total	12,223	116,281	9,513

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

Age	Number of Persons	Annual Benefit in Thousands	Average Annual Benefits
< 50	57	401	7,035
50 to 54	107	747	6,983
55 to 59	145	1,090	7,518
60 to 64	143	983	6,877
65 to 69	121	724	5,984
70 to 74	88	543	6,175
75 to 79	69	477	6,914
80 to 84	43	355	8,252
85 to 89	16	157	9,814
90 and up	8	101	12,642
Total	797	5,578	7,000



**MONTANA PUBLIC EMPLOYEES' RETIREMENT SYSTEM**  
**ACTUARIAL VALUATION AS OF JULY 1, 2004**

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**Table C-2**

**Distribution of Inactive Lives**

**Survivors of Deceased Members Receiving Retirement Benefits as of July 1, 2004**

Age	Number of Persons	Annual Benefit in Thousands	Average Annual Benefits
< 50	116	521	4,491
50 to 54	55	311	5,663
55 to 59	101	776	7,684
60 to 64	123	1,127	9,163
65 to 69	186	1,542	8,288
70 to 74	267	2,152	8,061
75 to 79	300	2,170	7,234
80 to 84	329	2,300	6,991
85 to 89	215	1,471	6,841
90 and up	122	978	8,013
Total	1,814	13,348	7,358

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

Age	Number
< 25	-
25 to 29	7
30 to 34	54
35 to 39	181
40 to 44	326
45 to 49	561
50 to 54	596
55 to 59	448
60 to 64	157
65 to 69	24
70 and up	8
Total	2,362

**MONTANA PUBLIC EMPLOYEES' RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF JULY 1, 2004**

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**Table C-3**

**Active Membership Data History**

Valuation Date (July 1)	Active Members					
	Total Contributing Members	Annual Salaries in Thousands	Average Annual Salary	Average Age	Average Years of Service	Average Hire Age
1998	28,091	\$660,588	\$23,516	44.9	8.8	36.1
2000	29,500	739,831	25,079	45.4	8.8	36.6
2002	29,808	815,130	27,346	46.2	9.1	37.1
2004	28,201	831,564	29,487	47.3	9.8	37.5

**MONTANA PUBLIC EMPLOYEES' RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF JULY 1, 2004**

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**Table C-4**

**Retired and Inactive Membership Data History**

Valuation Date (July 1)	All Annuitants			Terminated Members	
	Number	Annual Benefits in Thousands	Average Annual Benefit	Number Vested Terminated	Number Non-Vested Terminated
1998	12,924	87,115	6,741	1,653	8,474
2000	13,572	97,147	7,158	1,813	9,966
2002	14,116	115,613	8,190	2,150	10,944
2004	14,834	135,207	9,115	2,362	9,132

**MONTANA PUBLIC EMPLOYEES' RETIREMENT SYSTEM**  
**ACTUARIAL VALUATION AS OF JULY 1, 2004**

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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 this 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 Liability.
- Actuarial Gain or 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 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.
- 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 Surplus:** The excess, if any, of the Actuarial Value of Assets over the Actuarial Liability.
- Actuarial Valuation:** The determination, as of a Valuation Date, of the Normal Cost, Actuarial Liability, Actuarial Value of Assets, and related Actuarial Present Values for a retirement plan.

**MONTANA PUBLIC EMPLOYEES' RETIREMENT SYSTEM**  
**ACTUARIAL VALUATION AS OF JULY 1, 2004**

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<b>Actuarial Value of Assets:</b>	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.
<b>Actuarial Equivalent:</b>	Of equal Actuarial Present Value, determined as of a given date with each value based on the same set of Actuarial Assumptions.
<b>Entry Age Cost Method:</b>	An actuarial cost method under which the Actuarial Present Value of Projected Benefits of each individual included in an Actuarial Valuation is allocated on a level basis over the earnings of the individual between entry age and assumed exit ages. The portion of this Actuarial Present Value allocated to a valuation year is called the Normal Cost. The portion of this Actuarial Present Value not provided for at a valuation date by the Actuarial Present Value of future Normal Costs is called the Actuarial Liability.
<b>Normal Cost:</b>	The portion of the Actuarial Present Value of Projected Benefits which is allocated to a valuation year by the Actuarial Cost Method.
<b>Unfunded Actuarial Liability:</b>	The excess, if any, of the Actuarial Liability over the Actuarial Value of Assets.
<b>Valuation Date:</b>	July 1, 2004.