



**Montana Highway Patrol
Officers' Retirement System
of the
State of Montana**

**Actuarial Valuation
as of June 30, 2014**

Produced by [Cheiron](#)

September 2014

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September 30, 2014

Public Employees' Retirement Board
100 North Park, Suite 200
Helena, Montana 59620

Dear Members of the Board:

At your request, we have conducted the annual actuarial valuation of the Montana Highway Patrol Officers' Retirement System as of June 30, 2014. The results of the valuation are contained in this report. The purpose of the valuation is discussed in the Foreword.

This report contains information on the System's assets, as well as analyses which combine asset and liability performance and projections. The report also provides information regarding employer contribution levels and certain required disclosures for financial statements. The purpose of this report is to present the annual actuarial valuation of the Montana Highway Patrol Officers' Retirement System. This report is for the use of the Public Employees' Retirement Board and its auditors in preparing financial reports in accordance with applicable law and accounting requirements.

Your attention is called to the Foreword in which we refer to the general approach employed in the preparation of this report. We also comment on the sources and reliability of both the data and the actuarial assumptions on which our findings are based. The results of this report are only applicable for Fiscal Year ending 2014 and rely on future system experience conforming to the underlying assumptions. To the extent that actual system experience deviates from the underlying assumptions, the results would vary accordingly.

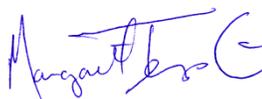
We hereby certify that, to the best of our knowledge, this report and its contents have been prepared in accordance with generally recognized and accepted actuarial principles and practices which are consistent with the Code of Professional Conduct and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board. Furthermore, as credentialed actuaries, we meet the Qualification Standards of the American Academy of Actuaries to render the opinion contained in this report. This report does not address any contractual or legal issues. We are not attorneys, and our firm does not provide any legal services or advice.

This actuarial report was prepared exclusively for the Montana Highway Patrol Officers' Retirement System for the purpose described herein. This valuation report is not intended to benefit any third party, and Cheiron assumes no duty or liability to any such party.

Sincerely,
Cheiron



Stephen T. McElhaney, FSA, FCA
Principal Consulting Actuary



Margaret Tempkin, FSA
Principal Consulting Actuary



FOREWORD

Cheiron has performed the Actuarial Valuation of the Montana Highway Patrol Officers' Retirement System as of June 30, 2014. The purpose of this report is to:

- 1) **Measure and disclose**, as of the valuation date, the financial condition of the System;
- 2) **Indicate trends** in the financial progress of the System;
- 3) **Determine the sufficiency of the statutory contribution rate** paid by the employers for Fiscal Year 2014 to meet the requirements of an actuarial rate calculated as the normal cost, administrative expense, and a level percent of pay 30-year open amortization of the unfunded actuarial liability; and
- 4) **Provide specific information** and documentation as may be required for financial statements.

An actuarial valuation establishes and analyzes system assets and liabilities on a consistent basis, and traces the progress of both from one year to the next. It includes measurement of the System's investment performance as well as an analysis of actuarial liability gains and losses.

Section I presents a summary containing our findings and disclosing important trends experienced by the System in recent years.

Section II contains details on various asset measures, together with pertinent performance measurements.

Section III shows similar information on system liabilities, measured for actuarial, accounting, and government reporting purposes.

Section IV develops the employer contribution rate determined using actuarial techniques.

Section V includes certain required disclosures for financial statements.

The appendices to this report contain a summary of the System's membership at the valuation date, a summary of the major provisions of the System, and the actuarial methods and assumptions used in the valuation.

In preparing our report, we relied on information (some oral and some written) supplied by the staff of the Public Employee Retirement Administration. This information includes, but is not limited to, plan provisions, employee data, and financial information. We performed an informal examination of the obvious characteristics of the data for reasonableness and consistency in accordance with Actuarial Standard of Practice No. 23.

The actuarial assumptions reflect our understanding of the likely future experience of the System and the assumptions as a whole represent our best estimate for the future experience of the System. The results of this report are dependent upon future experience conforming to these assumptions. To the extent that future experience deviates from the actuarial assumptions, the cost of the benefits would vary from our projections.

**MONTANA HIGHWAY PATROL OFFICERS' RETIREMENT SYSTEM
ACTUARIAL VALUATION AS OF JUNE 30, 2014**

**SECTION I
BOARD SUMMARY**

General Comments

The period to amortize unfunded actuarial liability decreased from 44.6 years at the June 30, 2013 valuation to 30.3 years as of June 30, 2014. During the year ended June 30, 2014, the System's assets gained 17.10% on a market value basis. However, due to the System's asset-smoothing technique which recognizes only a portion of the gains and losses, the return on the actuarial asset value was 13.13%. This return was above the assumed rate of return of 7.75% and resulted in an actuarial gain on investments of \$5.6 million.

The System also experienced an actuarial loss on system liabilities resulting from salary increases different than assumed and members retiring, terminating, becoming disabled, and dying at rates different from the actuarial assumptions. The loss added \$0.3 million to the expected actuarial liability. Experience gains and losses are normal in the course of the System's experience. The System will experience actuarial gains and losses over time because we cannot predict exactly how people will behave. When a system experiences alternating gains and losses that are small compared to the total actuarial liability, then the system's actuarial assumptions are reasonable.

As of the June 30, 2014 Actuarial Valuation, the System's unfunded actuarial liability was \$66.2 million. This is a decrease from last year's unfunded actuarial liability of \$69.9 million. The funded ratio increased from 60% at the prior valuation to 64% at June 30, 2014.

Montana Code Annotated (MCA) 19-2-407 requires an analysis of how market performance is affecting the actuarial funding of the Retirement System. It is our understanding of the Code to report certain key results on a market value of assets basis. The market value at June 30, 2014 was \$8.8 million greater than actuarial value. If market value were used rather than actuarial value, the funded ratio on the valuation date would be 69%, and the amortization period for the unfunded actuarial liability would be 23.9 years.

GASB Statement No. 67 became effective for the plan year ending June 30, 2014. Actuarial information related to required disclosures under GASB 67 has been provided in a separate report. Section V of this actuarial valuation report contains disclosures that have previously been required under GASB Statement No. 25, which has now been superseded by GASB 67. However, since GASB Statement No. 68 will not be effective until the fiscal year ending June 30, 2015 for most employers, employers must still provide disclosures under GASB Statement No. 27 for fiscal years ending June 30, 2014. Therefore, this information is provided in a format similar to prior years.

MONTANA HIGHWAY PATROL OFFICERS' RETIREMENT SYSTEM
ACTUARIAL VALUATION AS OF JUNE 30, 2014

SECTION I
BOARD SUMMARY

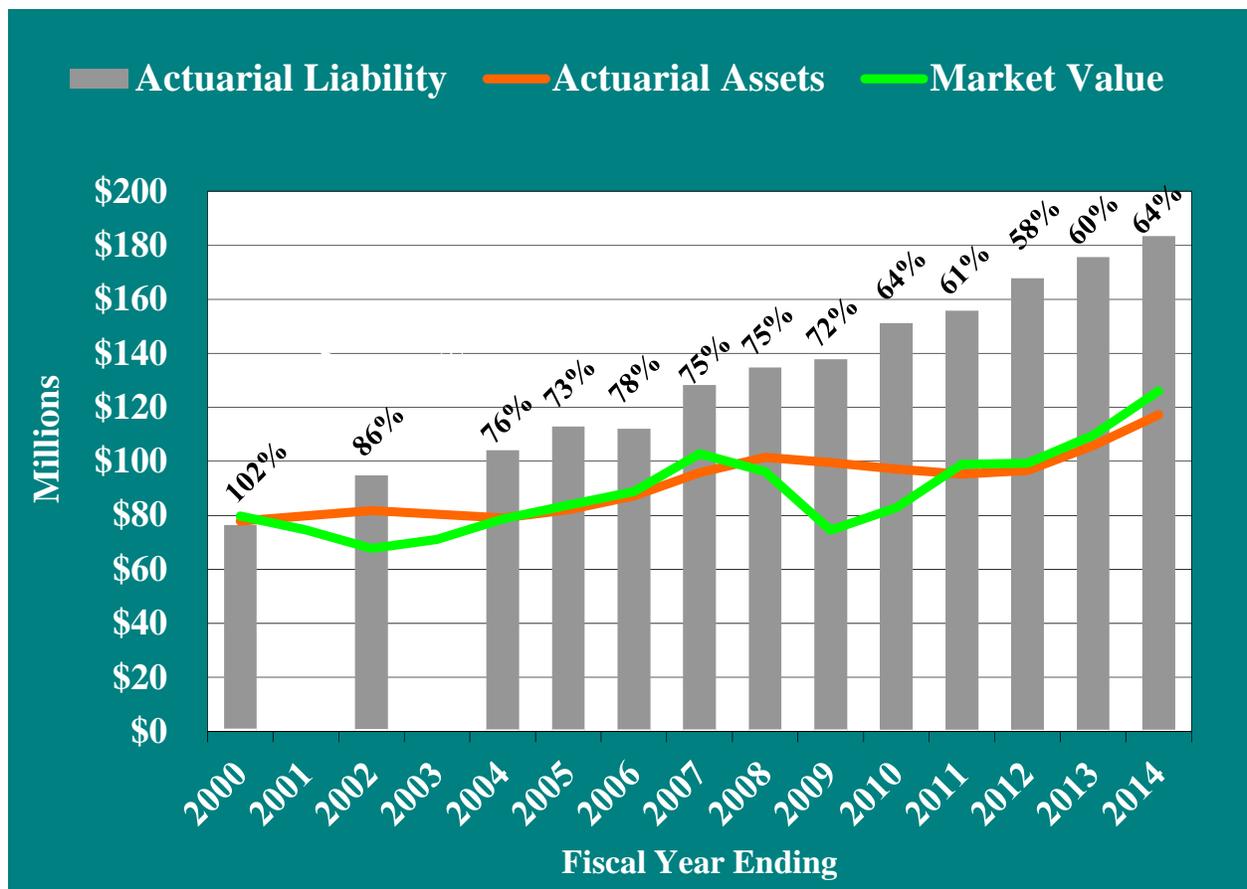
Trends

Assets and Liabilities

The market value of assets (MVA) increased over last year, returning 17.10% from the value at the prior valuation. The determination of the System's actuarial value of assets reflects only a portion of the amount by which the return was above the assumed rate of 7.75%.

Over the period July 1, 2009 to June 30, 2014, the System's assets returned approximately 5.3% per year measured at actuarial value, compared to a current valuation assumption of 7.75% per year.

For funding purposes, the target amount is represented by the top of the gray bar. We compare the actuarial value of assets to this measure of liability in developing the funded percent. These are the percentages shown in the graph labels.



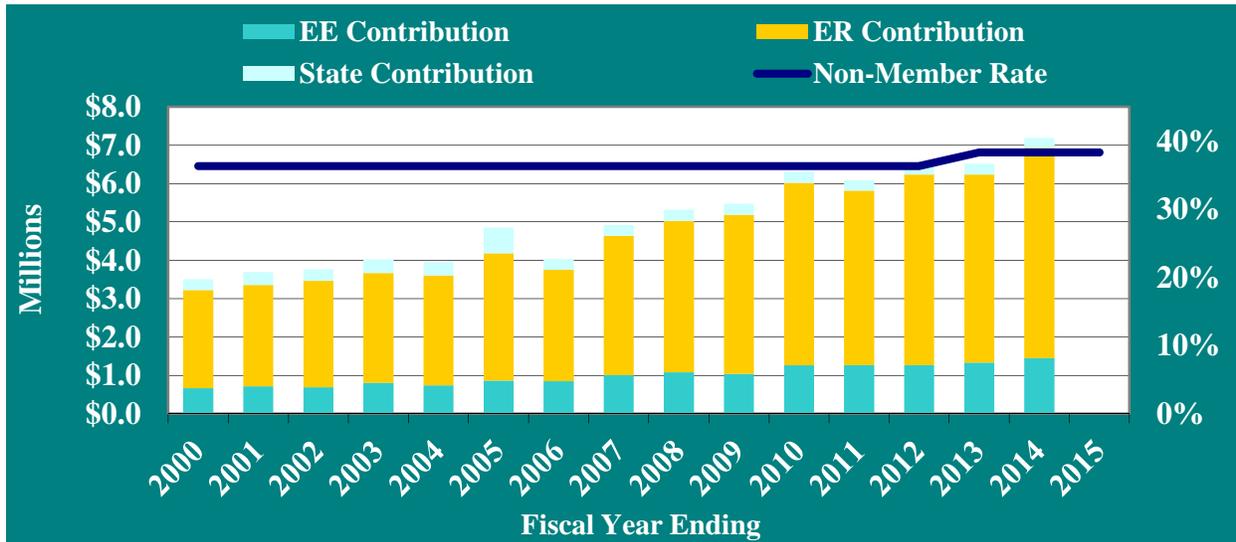
**MONTANA HIGHWAY PATROL OFFICERS' RETIREMENT SYSTEM
ACTUARIAL VALUATION AS OF JUNE 30, 2014**

**SECTION I
BOARD SUMMARY**

Contribution Rates

The stacked bars in this graph show the contributions made by members, employers, and the State (left-hand scale). The navy line shows the employer contribution rate as a percent of payroll (right-hand scale).

The employer and member contribution rates are set by State law. The actuarial valuation determines the extent to which the statutory contributions will meet the requirements of funding the System.



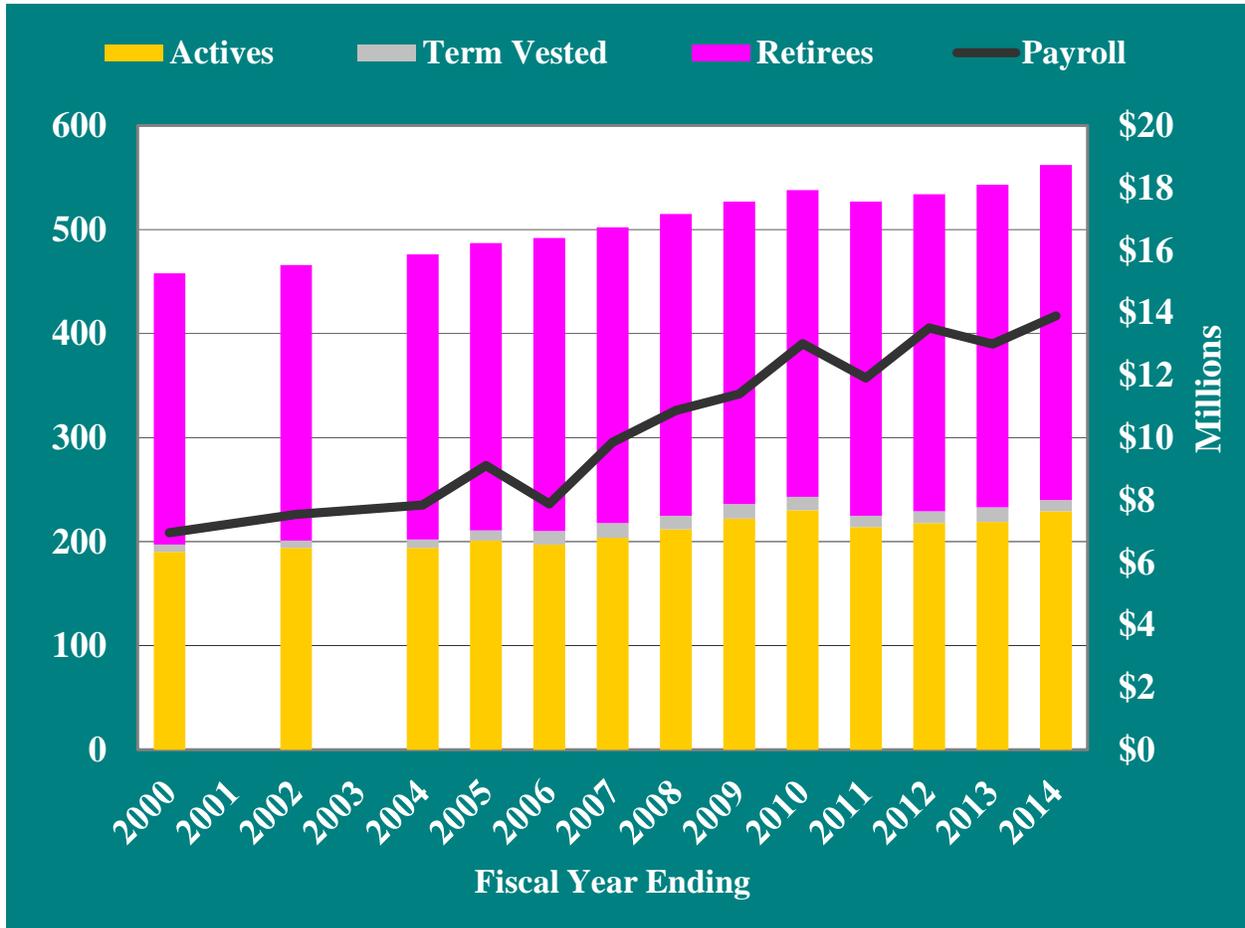
**MONTANA HIGHWAY PATROL OFFICERS' RETIREMENT SYSTEM
ACTUARIAL VALUATION AS OF JUNE 30, 2014**

**SECTION I
BOARD SUMMARY**

Participant Trends

The bars show the number of participants in each category and should be read using the left-hand scale. The active-to-inactive ratio has remained relatively constant with 0.7 actives for each inactive in 2000 and also 0.7 actives for each inactive today.

The black line shows the covered payroll in the System and is read using the right-hand scale.

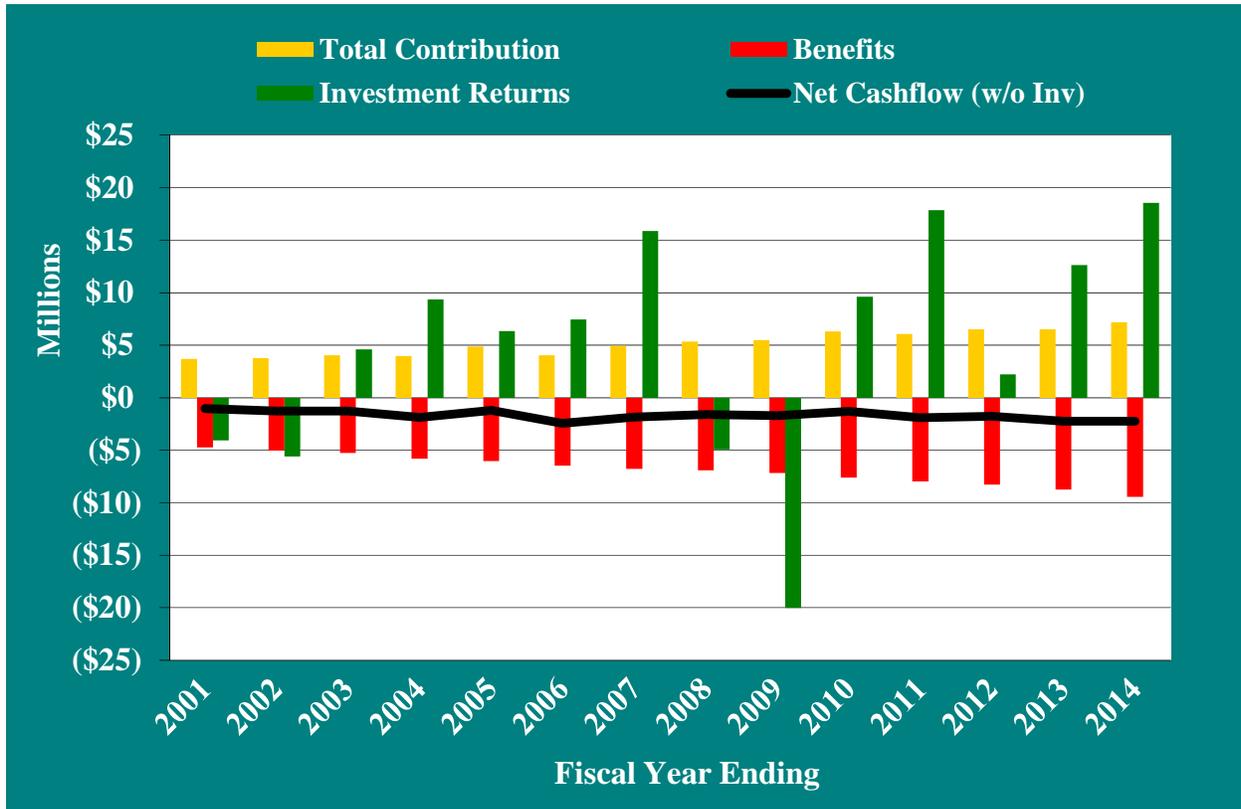


**MONTANA HIGHWAY PATROL OFFICERS' RETIREMENT SYSTEM
ACTUARIAL VALUATION AS OF JUNE 30, 2014**

**SECTION I
BOARD SUMMARY**

Net Cash Flow

This graph shows the historical contributions compared to benefit payments. The difference between these two measures is shown in the solid black line and is the net cash flow (without including investment returns).



**MONTANA HIGHWAY PATROL OFFICERS' RETIREMENT SYSTEM
ACTUARIAL VALUATION AS OF JUNE 30, 2014**

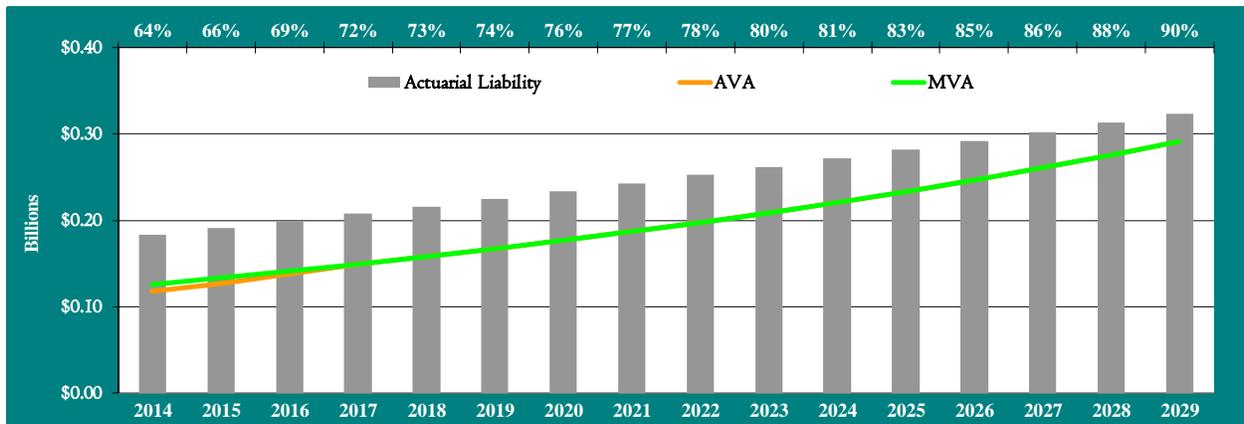
**SECTION I
BOARD SUMMARY**

Future Outlook

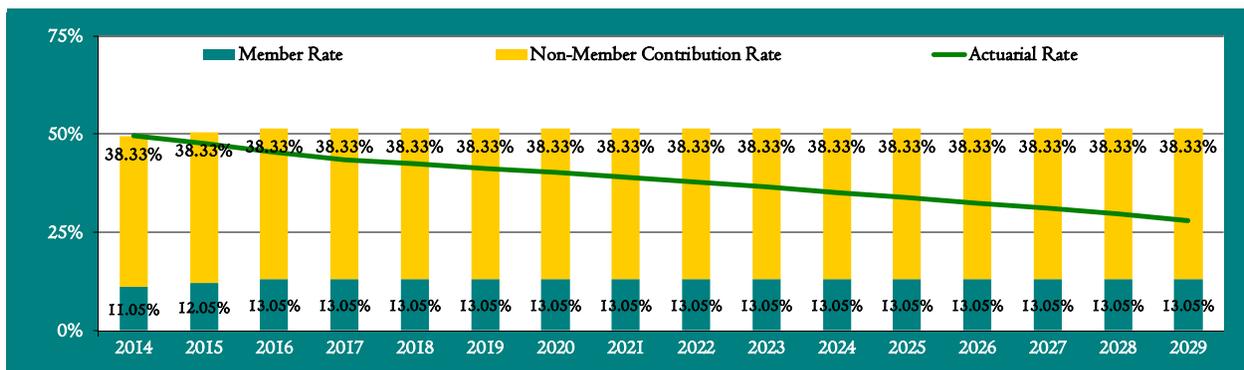
Baseline Projections

These graphs show the expected progress of the System over the next 15 years assuming the System's assets earn 7.75% on its *market value*, and that contributions continue to be made at the current statutory rates.

The values on top of the chart show that the funded status of the System is expected to increase gradually from the current ratio of 64% to 90% by the end of the 15-year period.



The chart below shows that the employer portion of the Actuarial Rate will decline steadily throughout the 15-year period. The Actuarial Rate is calculated as the normal cost, administrative expense, and a level percent of pay 30-year open amortization of the unfunded actuarial liability.

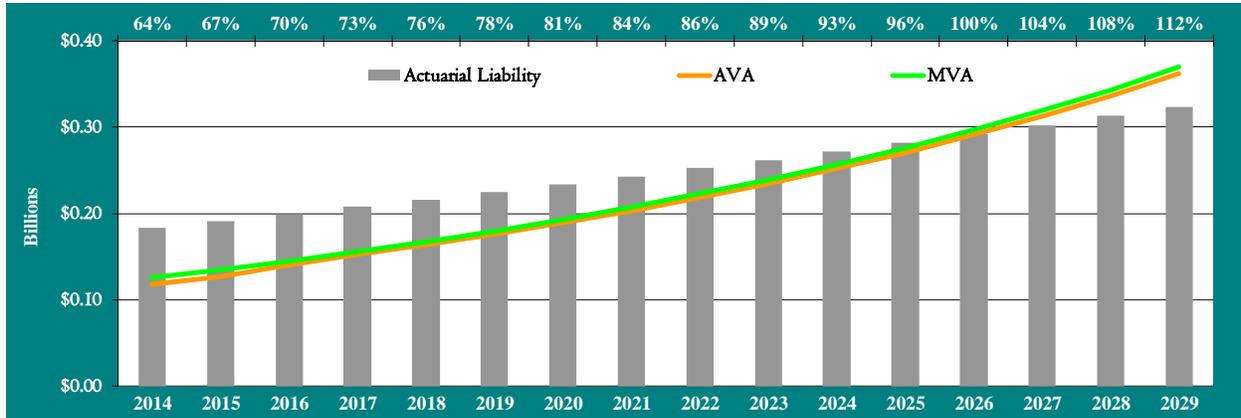


**MONTANA HIGHWAY PATROL OFFICERS' RETIREMENT SYSTEM
ACTUARIAL VALUATION AS OF JUNE 30, 2014**

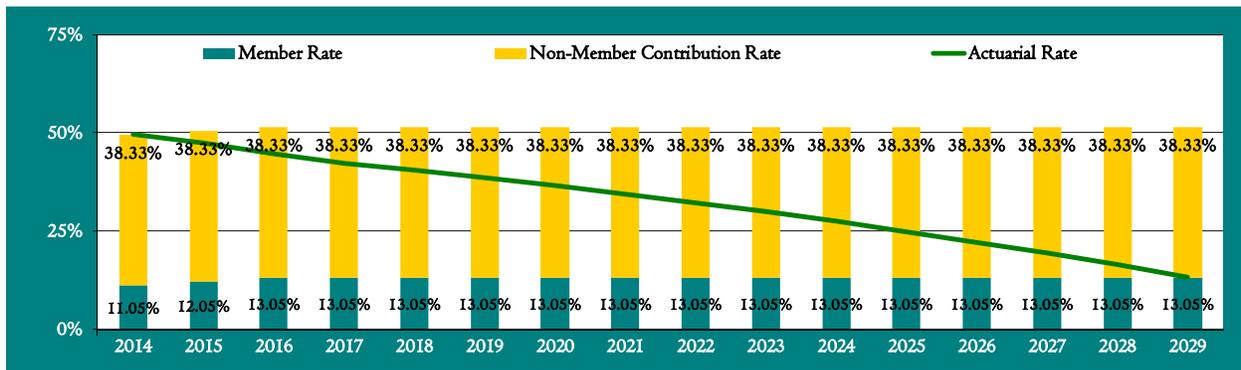
**SECTION I
BOARD SUMMARY**

Projections with Asset Returns of 9.25%

The future funding status of this System will be largely driven by the investment earnings. Changes in the rate of return on market value can have significant effects on the System's status. These two charts below show what the next 15 years would look like with a 9.25% annual return in each year (i.e., 1.5% greater than the assumed rate of return).



Compared to the baseline projections, the funded status begins to improve more quickly reaching 100% by the year 2026. The employer portion of the Actuarial Rate declines even faster toward zero throughout this 15-year period.

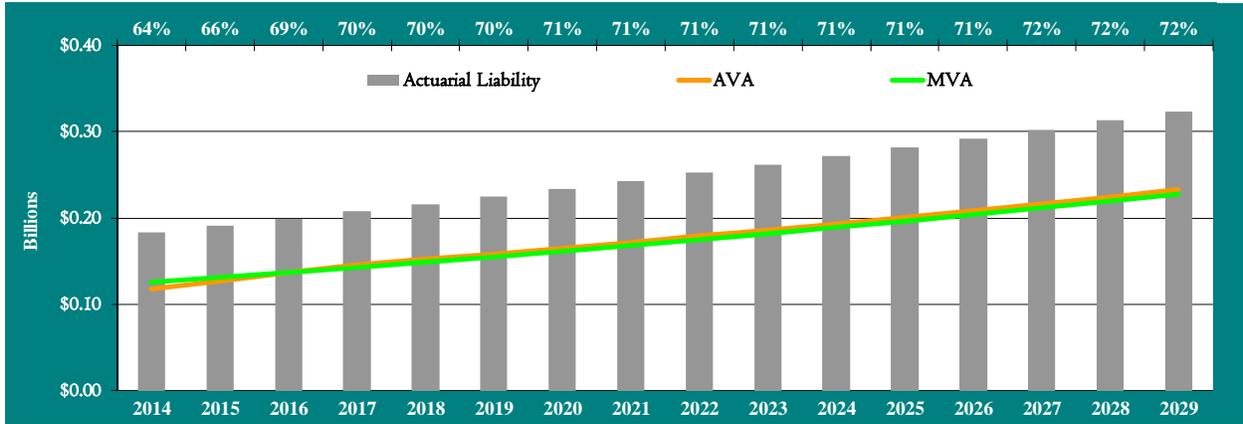


**MONTANA HIGHWAY PATROL OFFICERS' RETIREMENT SYSTEM
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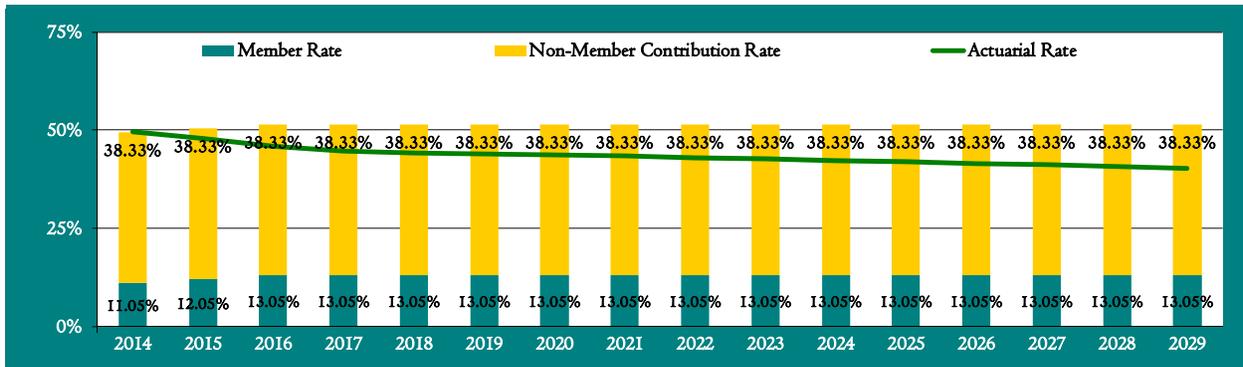
**SECTION I
BOARD SUMMARY**

Projections with Asset Returns of 6.25%

To further demonstrate how the future funding of this System will be driven by investment earnings, we show the anticipated system funding projections if the invested assets earn 6.25% per year over the entire 15-year period (i.e., 1.5% less than the assumed rate of return).



Under this scenario, the funded status continues to increase, but only reaches 72% by the end of the 15-year period. The employer portion of the Actuarial Rate declines much slower under this scenario.



MONTANA HIGHWAY PATROL OFFICERS' RETIREMENT SYSTEM
ACTUARIAL VALUATION AS OF JUNE 30, 2014

**SECTION I
BOARD SUMMARY**

Valuation as of:	June 30, 2013	June 30, 2014	% Change
Table I-1 Montana Highway Patrol Officers' Retirement System Summary of Principal System Results			
<u>Participant Counts</u>			
Active Members	219	229	4.6%
Disabled Members*	9	8	(11.1%)
Retirees and Beneficiaries*	301	314	4.3%
Terminated Vested Members	14	11	(21.4%)
Terminated Non-Vested Members	11	14	27.3%
Total**	554	576	4.0%
Annual Salaries of Active Members*	\$ 13,000,215	\$ 13,901,207	6.9%
Average Annual Salary	\$ 59,362	\$ 60,704	2.3%
Annual Retirement Allowances for Retired Members and Beneficiaries	\$ 8,782,354	\$ 9,336,474	6.3%
<u>Assets and Liabilities</u>			
Actuarial Liability (AL)	\$ 175,593,829	\$ 183,400,481	4.4%
Actuarial Value of Assets (AVA)	105,735,765	117,226,278	10.9%
Unfunded AL	\$ 69,858,064	\$ 66,174,203	(5.3%)
Funded Ratio (AVA/AL)	60.2%	63.9%	
Present Value of Accrued Benefits (PVAB)	\$ 159,274,389	\$ 165,422,227	3.9%
Market Value of Assets	109,690,706	126,010,392	14.9%
Unfunded PVAB	\$ 49,583,683	\$ 39,411,835	(20.5%)
Accrued Benefit Funding Ratio	68.9%	76.2%	
Ratio of Actuarial Value to Market Value	96.4%	93.0%	
<u>Contributions as a Percentage of Payroll</u>			
Statutory Funding Rate	48.38%	49.38%	
Normal Cost Rate	25.23%	24.46%	
Administrative Expense	N/A	0.23%	
Available for Amortization of UAL	23.15%	24.69%	
Period to Amortize	44.6 years	30.3 years	
Projected 30-year Level Funding Rate	53.31%	49.52%	
Projected Shortfall (Surplus)	4.93%	0.14%	

* Based on PERA categorization for the annual report. For actuarial valuation purposes, 23 members in 2013 and 24 members in 2014 were valued as disabled members with offsetting reductions to the number of retired members.

** A reconciliation of participant counts appears at the beginning of Appendix A.

SECTION II ASSETS

Pension plan assets play a key role in the financial operation of the System and in the decisions the Trustees may make with respect to future deployment of those assets. The level of assets, the allocation of assets among asset classes, and the methodology used to measure assets will likely have an impact upon benefit levels, State contributions, and the ultimate security of participants' benefits.

In this section, we present detailed information on the System's assets including:

- **Disclosure** of System assets at June 30, 2013 and June 30, 2014;
- Statement of the **changes** in market values during the year;
- Development of the **Actuarial Value of Assets**;
- An assessment of **investment performance**; and
- A projection of the System's expected **cash flows** for the next 10 years.

Disclosure

The market value of assets represents "snap-shot" or "cash-out" values which provide the principal basis for measuring financial performance from one year to the next. Market values, however, can fluctuate widely with corresponding swings in the marketplace.

The actuarial values are market values which have been smoothed and are used for evaluating the System's ongoing liability to meet its obligations.

The actuarial value of assets is the current market value, adjusted by a four-year smoothing of gains and losses on a market value basis. Each year's gain or loss is determined as the difference between the actual market return and the expected market return using the assumed rate of investment return.

MONTANA HIGHWAY PATROL OFFICERS' RETIREMENT SYSTEM
ACTUARIAL VALUATION AS OF JUNE 30, 2014

**SECTION II
ASSETS**

Table II-1 Changes in Market Values		
Value of Assets – June 30, 2013		\$ 109,690,706
<u>Additions</u>		
Member Contributions	\$ 1,455,548	
Employer Contributions	5,473,577	
State Contributions	261,930	
Investment Return	18,678,284	
Other	<u>2,494</u>	
Total Additions	\$ 25,871,833	
<u>Deductions</u>		
Benefit Payments	\$ 9,443,007	
Administrative Expenses	<u>109,140</u>	
Total Deductions	\$ 9,552,147	
Value of Assets – June 30, 2014		\$ 126,010,392

**MONTANA HIGHWAY PATROL OFFICERS' RETIREMENT SYSTEM
ACTUARIAL VALUATION AS OF JUNE 30, 2014**

**SECTION II
ASSETS**

Actuarial Value of Assets (AVA)

The actuarial value of assets represents a “smoothed” value developed by the actuary to reduce, or eliminate, volatile results which could develop from short-term fluctuations in the market value of assets. For this System, the actuarial value has been calculated by taking the market value of assets less 75% of the investment gain (loss) during the preceding year, less 50% of the investment gain (loss) during the second preceding year, and less 25% of the investment gain (loss) during the third preceding year. The tables below illustrate the calculation of actuarial value of assets for the June 30, 2014 valuation.

Table II-2 Market Value Gain/(Loss)	
Value of Assets – June 30, 2013	\$ 109,690,706
Total Contributions	7,193,549
Benefit Payments	(9,443,007)
Expected Return at 7.75%	<u>8,415,490</u>
Expected Value at June 30, 2014	\$ 115,856,738
Actual Value at June 30, 2014	\$ 126,010,392
Investment Gain/(Loss)	\$ 10,153,654

Table II-3 Develop Excluded Gain/(Loss)		
	Total Gain/(Loss)	Excluded Portion
Exclude 75% of 2014 Gain/(Loss)	\$ 10,153,654	\$ 7,615,241
Exclude 50% of 2013 Gain/(Loss)	\$ 5,035,198	\$ 2,517,599
Exclude 25% of 2012 Gain/(Loss)	\$ (5,394,905)	\$ (1,348,726)
Total Excluded Gain/(Loss) for AVA Calculation		\$ 8,784,114

Table II-4 Actuarial Value of Assets	
Market Value of Assets – June 30, 2014	\$ 126,010,392
Total Gain/(Loss) excluded	<u>8,784,114</u>
Actuarial Value of Assets – June 30, 2014	\$ 117,226,278

**MONTANA HIGHWAY PATROL OFFICERS' RETIREMENT SYSTEM
ACTUARIAL VALUATION AS OF JUNE 30, 2014**

**SECTION II
ASSETS**

Investment Performance

The market value of assets (MVA) returned 17.10% during fiscal year ended 2014, which is more than the assumed 7.75% return. A return of 13.13% on the actuarial value of assets (AVA) is primarily the result of the asset smoothing method being utilized for the calculation of the actuarial value of assets. Since only 25% of the gain or loss from the performance of the System is recognized in a given year, in periods of very good performance, the AVA can lag significantly behind the MVA. In a period of negative returns, the AVA does not decline as rapidly as the MVA.

Year Ending June 30,	Annual Rates of Return Market Value	Actuarial Value
2005	8.14%	5.27%
2006	9.03%	9.39%
2007	18.07%	12.07%
2008	(4.83%)	7.73%
2009	(20.98%)	(0.15%)
2010	13.04%	(1.16%)
2011	21.79%	(0.04%)
2012	2.24%	3.32%
2013	12.88%	11.86%
2014	17.10%	13.13%

MONTANA HIGHWAY PATROL OFFICERS' RETIREMENT SYSTEM
ACTUARIAL VALUATION AS OF JUNE 30, 2014

**SECTION II
ASSETS**

**Table II-6
Projection of System's Benefit Payments and Contributions
(in thousands)**

Year Beginning July 1,	Expected Benefits	Expected Admin Expense	Expected Contributions*	Net Cash Flow (excluding Investment Return)	Expected Investment Return**	Net Cash Flow (including Investment Return)
2014	\$ 9,809	\$ 34	\$ 7,265	\$ (2,578)	\$ 9,668	\$ 7,090
2015	10,217	35	7,708	(2,544)	10,218	7,674
2016	10,704	37	8,176	(2,565)	10,812	8,247
2017	11,195	38	8,503	(2,730)	11,445	8,715
2018	11,721	40	8,843	(2,918)	12,114	9,196
2019	12,310	41	9,196	(3,155)	12,817	9,662
2020	12,836	43	9,564	(3,315)	13,560	10,245
2021	13,450	45	9,947	(3,548)	14,345	10,797
2022	14,207	46	10,345	(3,908)	15,168	11,260
2023	14,891	48	10,759	(4,180)	16,031	11,851

* Expected contributions include Employer Contributions, State Contributions and Member Contributions. For illustration purposes, we have assumed that all contribution rates will increase as stated in the Summary of Plan Provisions (Appendix C) and that payroll will increase at the actuarially assumed rate of 4.00% per year.

** Expected investment return is based upon an assumed return of 7.75% per annum.

Expected benefit payments are projected for the closed group valued at June 30, 2014. Projecting any farther than 10 years using a closed-group would not yield reliable predictions due to the omission of new hires.

SECTION III LIABILITIES

In this section, we present detailed information on the System's liabilities including:

- **Disclosure** of System liabilities at June 30, 2013 and June 30, 2014;
- Statement of **changes** in these liabilities during the year;
- Details on the source of actuarial gains and losses between this valuation and the last; and
- Development of actuarial unfunded liability on a market value basis as required under MCA 19-2-407.

Disclosure

Several types of liabilities are calculated and presented in this report. Each type is distinguished by the people ultimately using the figures and the purpose for which they are using them.

- **Present Value of Benefits:** Used for analyzing the financial outlook of the System, this represents the amount of money needed today to fully pay off all future benefits and expenses of the System for the current participants, assuming participants continue to accrue benefits and all of the assumptions are met.
- **Actuarial Liability:** Used for funding calculations and GASB disclosures, this liability is calculated taking the Present Value of Benefits and subtracting the present value of future Member Contributions and future Employer Normal Costs under an acceptable actuarial funding method. This method is referred to as the **Entry Age Normal (EAN)** funding method.
- **Present Value of Accrued Benefits:** Used for communicating the current level of liabilities, this liability represents the total amount of money needed today to fully pay off the current accrued obligations of the System, assuming no future accruals of benefits. These liabilities are also required for accounting purposes (FASB ASC Topic No. 960) and used to assess whether the System can meet its current benefit commitments.

The following table discloses each of these liabilities for the current and prior valuations. With respect to each disclosure, a subtraction of the appropriate value of System assets yields, for each respective liability type, a **net surplus** or an **unfunded liability**.

MONTANA HIGHWAY PATROL OFFICERS' RETIREMENT SYSTEM
ACTUARIAL VALUATION AS OF JUNE 30, 2014

**SECTION III
LIABILITIES**

**Table III-1
Liabilities/Net (Surplus)/Unfunded**

	June 30, 2013	June 30, 2014
<u>Present Value of Benefits</u>		
Active Participant Benefits	\$ 82,369,735	\$ 84,099,889
Retiree and Inactive Benefits	120,013,772	127,766,357
Present Value of Benefits (PVB)	\$ 202,383,507	\$ 211,866,246
Market Value of Assets (MVA)	\$ 109,690,706	\$ 126,010,392
Future Member Contributions	13,333,467	15,087,961
Future Employer Contributions	38,479,636	45,358,553
Funding Shortfall/(Surplus)	40,879,698	25,409,340
Total Resources	\$ 202,383,507	\$ 211,866,246
<u>Actuarial Liability</u>		
Present Value of Benefits (PVB)	\$ 202,383,507	\$ 211,866,246
Present Value of Future Normal Costs (PVFNC)	26,789,678	28,465,765
Actuarial Liability (AL=PVB-PVFNC)	175,593,829	183,400,481
Actuarial Value of Assets (AVA)	105,735,765	117,226,278
Net (Surplus)/Unfunded (AL – AVA)	\$ 69,858,064	\$ 66,174,203
<u>Present Value of Accrued Benefits</u>		
Present Value of Benefits (PVB)	\$ 202,383,507	\$ 211,866,246
Present Value of Future Benefit Accruals (PVFBA)	43,109,118	46,444,019
Present Value of Accrued Benefits (PVAB=PVB-PVFBA)	\$ 159,274,389	\$ 165,422,227
Market Value of Assets (MVA)	109,690,706	126,010,392
Net Unfunded (PVAB – MVA)	\$ 49,583,683	\$ 39,411,835

**MONTANA HIGHWAY PATROL OFFICERS' RETIREMENT SYSTEM
ACTUARIAL VALUATION AS OF JUNE 30, 2014**

**SECTION III
LIABILITIES**

Changes in Liabilities

Each of the Liabilities disclosed in the prior table are expected to change at each valuation. The components of that change, depending upon which liability is analyzed, can include:

- New hires since the last valuation
- Benefits accrued since the last valuation
- System amendments changing benefits
- Passage of time which adds interest to the prior liability
- Benefits paid to retirees since the last valuation
- Participants retiring, terminating, or dying at rates different than expected
- A change in actuarial or investment assumptions
- A change in the actuarial funding method

Unfunded liabilities will change because of all of the above, and also due to changes in the System's assets resulting from:

- Employer contributions different than expected
- Investment earnings different than expected
- A change in the method used to measure System assets

In each valuation, we report on those elements of change which are of particular significance, potentially affecting the long-term financial outlook of the System. Below, we present key changes in liabilities since the last valuation. On the next page, we provide more detail on the sources of the actuarial (gain)/loss as measured on the basis of actuarial liability.

Table III-2 Changes in Liabilities			
	Present Value of Benefits	Actuarial Liability	Present Value of Accrued Liability
Liabilities June 30, 2013	\$ 202,383,507	\$ 175,593,829	\$ 159,274,389
Liabilities June 30, 2014	211,866,246	183,400,481	165,422,227
Liability			
Increase (Decrease)	9,482,739	7,806,652	6,147,838
Change Due to:			
Actuarial (Gain)/Loss	NC*	267,336	NC*
Plan Changes	0	0	0
Benefits Accumulated and Other Sources	9,482,739	7,539,316	6,147,838

* NC = not calculated.

MONTANA HIGHWAY PATROL OFFICERS' RETIREMENT SYSTEM
ACTUARIAL VALUATION AS OF JUNE 30, 2014

**SECTION III
LIABILITIES**

**Table III-3
Summary of Actuarial Gains and Losses as of June 30, 2014**

Actuarial Liabilities as of June 30, 2013	\$ 175,593,829
Normal Cost	3,464,399
Actual Benefit Payments	(9,443,007)
Interest	13,517,924
Expected Actuarial Liability as of June 30, 2014	<u>183,133,145</u>
Actuarial Liability as of June 30, 2014	\$ 183,400,481
Liability (Gain)/Loss	\$ 267,336
Sources of Liability (Gain)/Loss	
Salary (Gain)/Loss	\$ (414,160)
New Participant (Gain)/Loss	755,091
Active Retirements (Gain)/Loss	(382,080)
Active Terminations (Gain)/Loss	377,425
Active Deaths (Gain)/Loss	(35,821)
Active Disability (Gain)/Loss	(30,973)
Inactive Mortality (Gain)/Loss	(444,944)
Other (Gain)/Loss	442,798
Actuarial Liability as of June 30, 2014	\$ 183,400,481
Liability (Gain)/Loss due to Plan Changes	\$ 0
Actuarial Value of Assets as of June 30, 2013	\$ 105,735,765
Net Cash Flow	(2,249,458)
Expected Earnings	8,108,982
Expected Actuarial Value of Assets as of June 30, 2014	<u>111,595,289</u>
Actuarial Value of Assets as of June 30, 2014	\$ 117,226,278
Investment (Gain)/Loss	\$ (5,630,989)
Total Liability (Gain)/Loss	<u>267,336</u>
Total Actuarial (Gain)/Loss	\$ (5,363,653)

**MONTANA HIGHWAY PATROL OFFICERS' RETIREMENT SYSTEM
ACTUARIAL VALUATION AS OF JUNE 30, 2014**

**SECTION III
LIABILITIES**

Table III-4 shows the actuarial liabilities as of the prior and current valuation dates. The unfunded actuarial liability is the difference between the actuarial liability and the actuarial value of assets. The funded ratio is the ratio of the actuarial value of assets to the actuarial liability.

Table III-4 Actuarial Liabilities for Funding		
	June 30, 2013	June 30, 2014
1. Actuarial Liabilities		
Retiree and Inactive Benefits	\$ 120,013,772	\$ 127,766,357
Active Member Benefits	<u>55,580,057</u>	<u>55,634,124</u>
Total Actuarial Liability	\$ 175,593,829	\$ 183,400,481
2. Actuarial Value of Assets	\$ 105,735,765	\$ 117,226,278
3. Unfunded Actuarial Liability	\$ 69,858,064	\$ 66,174,203
4. Funded Ratio	60.2%	63.9%

Montana Code Annotated (MCA) 19-2-407 requires an analysis of how market performance is affecting the actuarial funding of the System. Table III-5 presented below shows the same information as in Table III-4 above, but using market value of assets rather than actuarial value of assets.

Table III-5 Actuarial Liabilities on Market Value Basis (MCA 19-2-407)		
	June 30, 2013	June 30, 2014
1. Actuarial Liabilities		
Retiree and Inactive Benefits	\$ 120,013,772	\$ 127,766,357
Active Member Benefits	<u>55,580,057</u>	<u>55,634,124</u>
Total Actuarial Liability	\$ 175,593,829	\$ 183,400,481
2. Market Value of Assets	\$ 109,690,706	\$ 126,010,392
3. Unfunded Actuarial Liability	\$ 65,903,123	\$ 57,390,089
4. Funded Ratio	62.5%	68.7%

**SECTION IV
CONTRIBUTIONS**

In the process of evaluating the financial condition of any pension plan, the actuary analyzes the assets and liabilities to determine what level (if any) of contributions is needed to properly maintain the funding status of the System. Typically, the actuarial process will use a funding technique that will result in a pattern of contributions that are both stable and predictable.

For this System, the funding method employed is the **Entry Age Normal Actuarial Cost Method**. Under this method, there are three components to the total contribution: the **normal cost rate**, the **unfunded actuarial liability rate** (UAL rate), and the **administrative expense rate**. The normal cost rate is determined by taking the value, as of entry age into the System, of each member's projected future benefits. This value is then divided by the value, also at entry age, of each member's expected future salary. The normal cost rate is multiplied by current salary to determine each member's normal cost rate. Finally, the total normal cost rate is reduced by the member contribution to produce the employer normal cost rate. The difference between the EAN actuarial liability and the actuarial value of assets is the unfunded actuarial liability.

For purposes of determining the adequacy of the statutory funding rate, the UAL rate is calculated by subtracting the normal cost rate from the statutory rate. A calculation is then made to determine the period over which the UAL rate will amortize the unfunded actuarial liability. A second UAL rate is calculated based upon a 30-year amortization of the UAL, which, consistent with prior years, is the maximum amortization period that was permitted under GASB Statement No. 25. However, this rate should not necessarily be construed as a recommended contribution level. All UAL payments are determined as a level percentage of pay, assuming that total pay increases by the annual inflation rate of 4.00%.

The assumed administrative expense rate is 0.23% of payroll. This rate, when applied to payroll, is intended to provide an allowance above the cost of funding the benefits to pay for the expense of operating this System.

**MONTANA HIGHWAY PATROL OFFICERS' RETIREMENT SYSTEM
ACTUARIAL VALUATION AS OF JUNE 30, 2014**

**SECTION IV
CONTRIBUTIONS**

The tables below present and compare the contribution rates for the System for this valuation and the prior one.

Table IV-1		
Statutory Basis		
	June 30, 2013	June 30, 2014
Statutory Funding Rates		
Members	10.05%	11.05%
Employers	28.15%	28.15%
State	10.18%	10.18%
Total	48.38%	49.38%
Normal Cost Rate*	25.23%	24.46%
Administrative Expense	N/A	0.23%
Funding Rate Available for Amortization	23.15%	24.69%
Unfunded Actuarial Liability (Surplus)	\$69,858,064	\$66,174,203
Years to Amortize**	44.6 years	30.3 years

* The normal cost rate is projected to be 20.12% for members eligible after July 1, 2013. It is expected that the average normal cost rate will decrease over the next generation of active plan members.

** On a market value basis, the Years to Amortize the Unfunded Actuarial Liability was 39.0 years at June 30, 2013 and 23.9 years at June 30, 2014.

**MONTANA HIGHWAY PATROL OFFICERS' RETIREMENT SYSTEM
ACTUARIAL VALUATION AS OF JUNE 30, 2014**

**SECTION IV
CONTRIBUTIONS**

Table IV-2		
Calculated Contribution Basis		
	June 30, 2013	June 30, 2014
Normal Cost Rate	25.23%	24.46%
Amortization Payment (30-years)	28.08%	24.83%
Administrative Expense	N/A	0.23%
Total Calculated Contribution Rate	<u>53.31%</u>	<u>49.52%</u>
Less Statutory Rate	<u>48.38%</u>	<u>49.38%</u>
Shortfall (Surplus) in Statutory Rate	4.93%	0.14%

Table IV-3		
Calculated Contribution on Market Value (MCA 19-2-407)		
	June 30, 2013	June 30, 2014
Normal Cost Rate	25.23%	24.46%
Amortization Payment (30-years)	26.49%	21.53%
Administrative Expense	N/A	0.23%
Total Calculated Contribution Rate	<u>51.72%</u>	<u>46.22%</u>
Less Statutory Rate	<u>48.38%</u>	<u>49.38%</u>
Shortfall (Surplus) in Statutory Rate	3.34%	(3.16%)

The following table projects the results for the next five valuations (assuming all assumptions are met, including 7.75% return).

Table IV-4	
Projected Actuarial Contribution Rates	
Valuation Year	Rate
2015	47.67%
2016	45.33%
2017	43.44%
2018	42.39%
2019	41.31%

**MONTANA HIGHWAY PATROL OFFICERS' RETIREMENT SYSTEM
ACTUARIAL VALUATION AS OF JUNE 30, 2014**

**SECTION V
FINANCIAL STATEMENT INFORMATION**

Prior to the current plan year, Statement No. 25 of the Governmental Accounting Standards Board (GASB) established standards for disclosure of pension information by public employee retirement systems (PERS) and governmental employers in notes to financial statements and supplementary information. While GASB-25 is no longer applicable for this System, the requirements of GASB Statement No. 27 remain in effect for the employer(s) who contribute(s) to the System. Therefore, the GASB-25 information is provided similarly as in prior years. The GASB-25 actuarial liability is the same as the actuarial liability amount calculated for funding purposes.

GASB-25 was replaced by GASB-67 effective June 30, 2014 for plan disclosures, which have been provided in a separate report. For employers with June 30 fiscal years, GASB-68 will replace GASB-27 effective for the fiscal year ending June 30, 2015.

Accounting Standard Codification Topic No. 960 of the Financial Accounting Standards Board specifies certain information for a plan to disclose regarding its funded status. The FASB ASC Topic No. 960 disclosures provide a quasi "snap shot" view of how the System's assets compare to its liabilities if contributions stopped and accrued benefit claims had to be satisfied. However, due to potential legal requirements and the possibility that alternative interest rates would have to be used to determine the liabilities, these values may not be a good indication of the amount of money it would take to buy the benefits for all members if the System were to terminate.

Both the present value of accrued benefits (FASB ASC Topic No. 960) and the actuarial liability (GASB-25/27) are determined assuming that the System is on-going and participants continue to terminate employment, retire, etc., in accordance with the actuarial assumptions. Liabilities are discounted at the assumed valuation interest rate of 7.75% per annum.

FASB ASC Topic No. 960 specifies that a comparison of the present value of accrued (accumulated) benefits with the market value of the assets as of the valuation date must be provided. GASB Statement No. 25/27 required the actuarial liability be compared with the actuarial value of assets for funding purposes. The relevant amounts as of June 30, 2014 are exhibited in Table V-1.

Table V-2, Note to Required Supplementary Information, may be used for employers' CAFRs in relation to GASB-27.

Tables V-3 through V-5 are exhibits which may be used for the System's CAFR. Table V-3 is a history of gains and losses in Accrued Liability, Table V-4 is the Schedule of Funding Progress, and Table V-5 is the Solvency Test which shows the portion of Accrued Liability covered by Assets.

MONTANA HIGHWAY PATROL OFFICERS' RETIREMENT SYSTEM
ACTUARIAL VALUATION AS OF JUNE 30, 2014

SECTION V
FINANCIAL STATEMENT INFORMATION

Table V-1		
Financial Statement Information		
	June 30, 2013	June 30, 2014
A. FASB ASC Topic No. 960 Basis		
1. Present Value of Benefits Accrued and Vested to Date		
a. Members Currently Receiving Payments	\$ 117,914,093	\$ 126,478,378
b. Former Vested Members	2,099,679	1,287,979
c. Active Members	<u>39,260,617</u>	<u>37,655,870</u>
2. Total Present Value of Accrued Benefits (1 (a) + 1(b) + 1(c))	\$ 159,274,389	\$ 165,422,227
3. Assets at Market Value	<u>109,690,706</u>	<u>126,010,392</u>
4. Unfunded Present Value of Accrued Benefits (2 – 3)	\$ 49,583,683	\$ 39,411,835
5. Ratio of Assets to Present Value of Accrued Benefits (3 / 2)	68.9%	76.2%
B. GASB No. 25/27 Basis		
1. Actuarial Liabilities for retirees and beneficiaries currently receiving benefits and terminated employees not yet receiving benefits	\$ 120,013,772	\$ 127,766,357
2. Actuarial Liabilities for current employees	<u>55,580,057</u>	<u>55,634,124</u>
3. Total Actuarial Liability (1 + 2)	\$ 175,593,829	\$ 183,400,481
4. Net Actuarial Assets available for benefits	<u>105,735,765</u>	<u>117,226,278</u>
5. Unfunded Actuarial Liability (3 – 4)	\$ 69,858,064	\$ 66,174,203

MONTANA HIGHWAY PATROL OFFICERS' RETIREMENT SYSTEM
ACTUARIAL VALUATION AS OF JUNE 30, 2014

SECTION V
FINANCIAL STATEMENT INFORMATION

Table V-2
Note To Required Supplementary Information

The information presented in the required supplementary schedules was determined as part of the actuarial valuation at the date indicated. Additional information as of the latest actuarial valuation follows.

Valuation date	June 30, 2014
Actuarial cost method	Entry Age Normal
Amortization method	Open
Remaining amortization period for Actuarial Contribution	30 years
Asset valuation method	Four-Year smoothed market
Actuarial assumptions:	
Investment rate of return*	7.75%
General wage growth*	4.00%
Merit salary increases	0.0% - 7.3%
*Includes inflation at	3.00%

The actuarial assumptions used have been recommended based on the most recent review of the System's experience (completed in 2010) and adopted by the Retirement Board.

The rate of employer contributions to the System is composed of the normal cost, amortization of the unfunded actuarial liability, and an allowance for administrative expenses. The normal cost is a level percent of payroll cost which will pay for projected benefits at retirement for each participant. The actuarial liability is that portion of the present value of projected benefits that will not be paid by future normal costs. The difference between this liability and the funds accumulated as of the same date is the unfunded actuarial liability. The allowance for administrative expenses is based upon the System's recent history of administrative expenses.

MONTANA HIGHWAY PATROL OFFICERS' RETIREMENT SYSTEM
ACTUARIAL VALUATION AS OF JUNE 30, 2014

SECTION V
FINANCIAL STATEMENT INFORMATION

Table V-3
Analysis of Financial Experience

Gain and Loss in Accrued Liability During Years Ended June 30
Resulting from Differences Between Assumed Experience and Actual Experience

Gain (or Loss) for Year ending June 30,
(expressed in thousands)

Type of Activity	2009	2010	2011	2012	2013	2014
Investment Income on Actuarial Assets	\$ (8,202)	\$ (9,065)	\$ (7,496)	\$ (4,179)	\$ 3,921	\$ 5,631
Combined Liability Experience	<u>2,835</u>	<u>(4,848)</u>	<u>2,128</u>	<u>(5,603)</u>	<u>1,648</u>	<u>(267)</u>
(Loss)/Gain During Year from Financial Experience	\$ (5,367)	\$ (13,913)	\$ (5,368)	\$ (9,782)	\$ 5,569	\$ 5,364
Non-Recurring Items	<u>0</u>	<u>(2,700)</u>	<u>0</u>	<u>0</u>	<u>(2,179)</u>	<u>0</u>
Composite Gain (or Loss) During Year	\$ (5,367)	\$ (16,613)	\$ (5,368)	\$ (9,782)	\$ 3,390	\$ 5,364

Table V-4
Schedule of Funding Progress
(expressed in thousands)

Valuation Date June 30,	Actuarial Value of Assets	Actuarial Accrued Liability (AAL)	Funded Ratio	Unfunded AAL (UAAL)	Covered Payroll	UAAL as a Percentage of Covered Payroll
2014	\$ 117,226	\$ 183,400	64 %	\$ 66,174	\$ 14,149	468 %
2013	105,736	175,594	60 %	69,858	13,484	518 %
2012	96,655	167,824	58 %	71,169	13,618	523 %
2011	95,274	155,742	61 %	60,468	12,472	485 %
2010	97,204	151,177	64 %	53,973	13,036	414 %
2009	99,652	137,815	72 %	38,163	11,425	334 %

MONTANA HIGHWAY PATROL OFFICERS' RETIREMENT SYSTEM
ACTUARIAL VALUATION AS OF JUNE 30, 2014

SECTION V
FINANCIAL STATEMENT INFORMATION

Table V-5
Solvency Test
Aggregate Accrued Liabilities for
(expressed in thousands)

Valuation Date June 30,	Active Member Contributions (1)	Retirees & Beneficiaries (2)	Active Member Employer Financed Contributions (3)	Actuarial Value of Reported Assets	Portion of Accrued Liabilities Covered by Reported Assets		
					(1)	(2)	(3)
2014	\$ 11,507	\$ 126,478	\$ 45,416	\$ 117,226	100 %	84 %	0 %
2013	11,339	117,914	46,341	105,736	100 %	80 %	0 %
2012	11,455	110,876	45,493	96,655	100 %	77 %	0 %
2011	10,795	107,035	37,911	95,274	100 %	79 %	0 %
2010	10,369	102,450	38,359	97,204	100 %	85 %	0 %
2009	9,571	97,087	31,157	99,652	100 %	93 %	0 %

**MONTANA HIGHWAY PATROL OFFICERS' RETIREMENT SYSTEM
ACTUARIAL VALUATION AS OF JUNE 30, 2014**

**APPENDIX A
MEMBERSHIP INFORMATION**

Reconciliation of Participant Counts						
	Active	Disabled	Retirees and Beneficiaries	Terminated Vested Members	Terminated Non-Vested Members	Total
Participant counts used for valuation	229	24	298	11	14	576
Disabled members having attained normal retirement age		(16)	16			-
Beneficiaries of Disabled Members						-
Beneficiaries with less than one year of certain payments remaining			-			-
Other Adjustments						-
Participant counts shown in Annual Financial Report	229	8	314	11	14	576

This chart is presented for informational purposes only. The counts shown in the valuation line were used for preparation of the liabilities disclosed within this report. The counts disclosed for the Annual Financial Report and the Board Summary (page 9) match the CAFR reports at the request of the Board. The differences between the counts, if any, have no material effect upon the liability calculation.

**MONTANA HIGHWAY PATROL OFFICERS' RETIREMENT SYSTEM
ACTUARIAL VALUATION AS OF JUNE 30, 2014**

**APPENDIX A
MEMBERSHIP INFORMATION**

Status Reconciliation							
	Active	Retired	Vested	Non Vested	Disabled	Survivor	Total
Members on July 1, 2013	219	213	14	11	23	74	554
New Hires	26	0	0	0	0	0	26
Rehires	0	0	0	0	0	0	0
Retired	(9)	13	(3)	0	0	0	1
Terminated Vested	(3)	0	7	0	0	0	4
Terminated Non Vested	(3)	0	0	5	0	0	2
Active Deaths	0	0	0	0	0	0	0
Became Disabled	(1)	0	0	0	1	0	0
In Pay Deaths	0	(5)	(4)	0	0	(3)	(12)
Survivors	0	0	0	0	0	6	6
Cash Out	0	0	(3)	(2)	0	0	(5)
Members on July 1, 2014	229	221	11	14	24	77	576

The salaries used in the tables and charts which follow are different than the salaries used for the Board Summary on page 9. For this Appendix A, the valuation projected salaries are to be paid for the following fiscal year, whereas for the Board Summary, salaries are applicable in the year ending on the valuation date.

The benefits for retirees and beneficiaries used for the tables and charts which follow are different than the benefits used for the Board Summary on page 9. For this Appendix A, the valuation projected benefits to be paid for the following fiscal year (including Guaranteed Annual Benefit Adjustment (GABA) where applicable), whereas for the Board Summary, annual benefits are as of the valuation date.

**MONTANA HIGHWAY PATROL OFFICERS' RETIREMENT SYSTEM
ACTUARIAL VALUATION AS OF JUNE 30, 2014**

**APPENDIX A
MEMBERSHIP INFORMATION**

**Montana Highway Patrol Officers' Retirement System Distribution of
Active Members by Age and Service as of June 30, 2014**

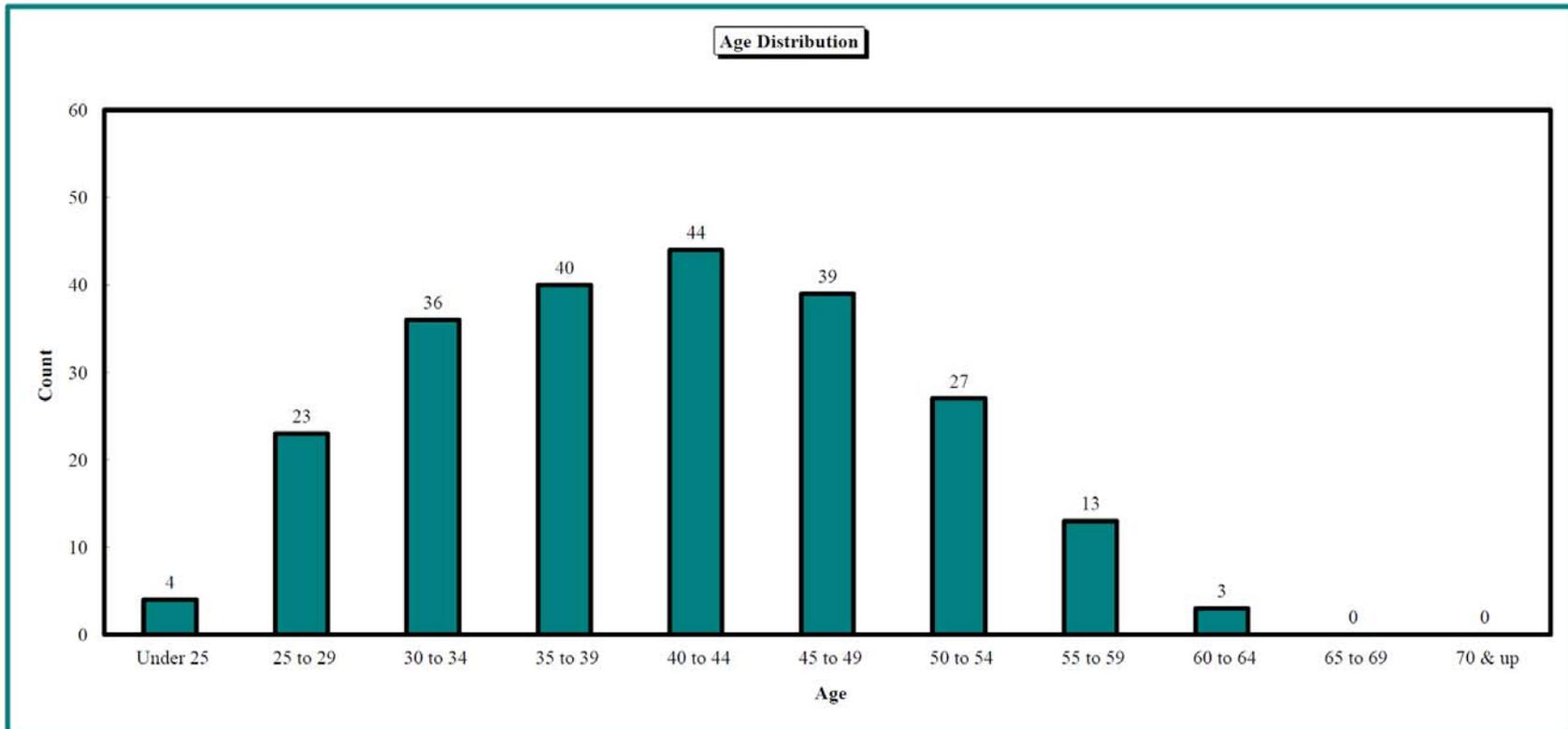
COUNTS BY AGE/SERVICE

Age	Service										Total
	Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & up	
Under 25	4	0	0	0	0	0	0	0	0	0	4
25 to 29	14	7	2	0	0	0	0	0	0	0	23
30 to 34	6	13	15	2	0	0	0	0	0	0	36
35 to 39	1	5	20	14	0	0	0	0	0	0	40
40 to 44	0	1	11	16	15	1	0	0	0	0	44
45 to 49	0	3	6	9	11	10	0	0	0	0	39
50 to 54	0	0	7	8	5	5	2	0	0	0	27
55 to 59	0	0	3	3	4	2	1	0	0	0	13
60 to 64	0	1	0	0	0	0	1	1	0	0	3
65 to 69	0	0	0	0	0	0	0	0	0	0	0
70 & up	0	0	0	0	0	0	0	0	0	0	0
Total	25	30	64	52	35	18	4	1	0	0	229

MONTANA HIGHWAY PATROL OFFICERS' RETIREMENT SYSTEM
ACTUARIAL VALUATION AS OF JUNE 30, 2014

APPENDIX A
MEMBERSHIP INFORMATION

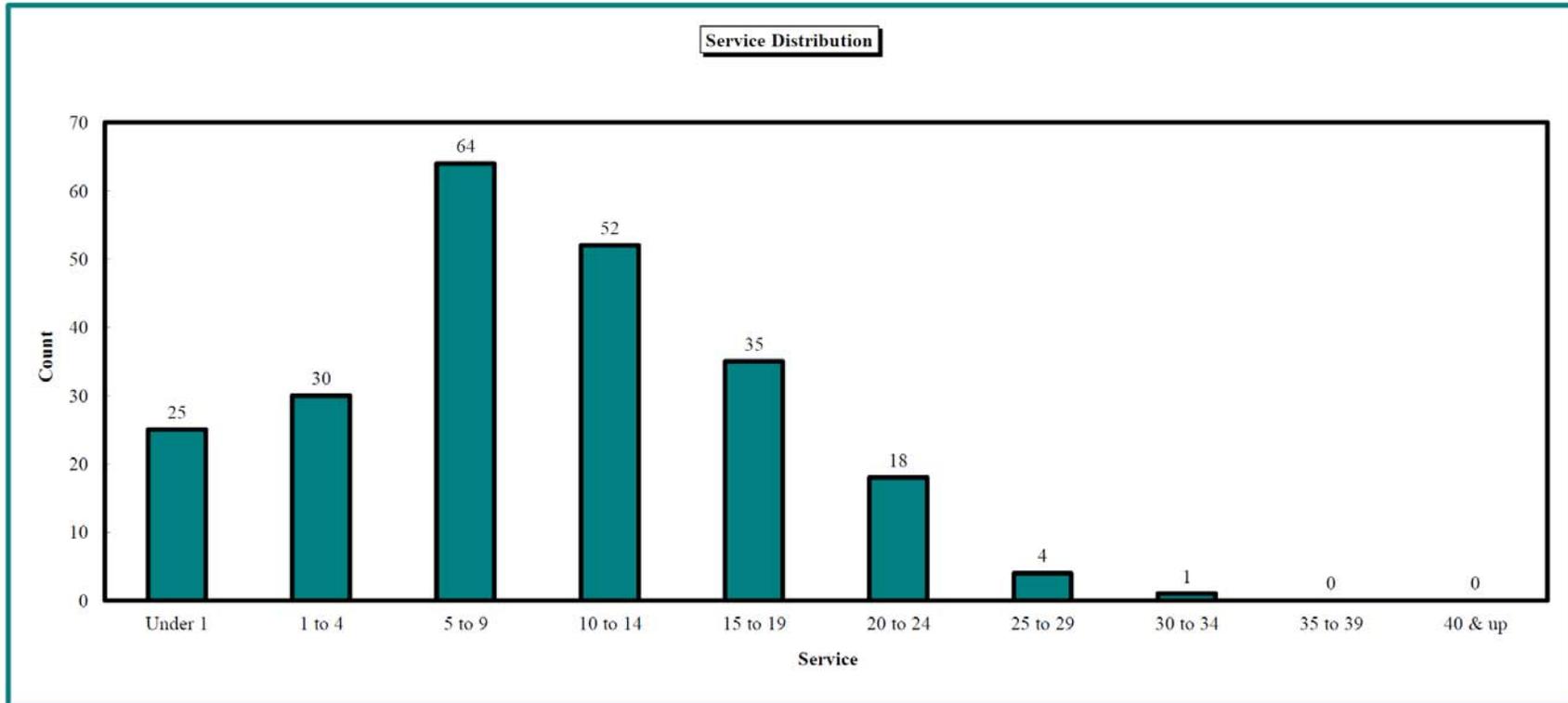
Montana Highway Patrol Officers' Retirement System Distribution of
Active Members by Age as of June 30, 2014



MONTANA HIGHWAY PATROL OFFICERS' RETIREMENT SYSTEM
ACTUARIAL VALUATION AS OF JUNE 30, 2014

APPENDIX A
MEMBERSHIP INFORMATION

Montana Highway Patrol Officers' Retirement System Distribution of
Active Members by Service as of June 30, 2014



**MONTANA HIGHWAY PATROL OFFICERS' RETIREMENT SYSTEM
ACTUARIAL VALUATION AS OF JUNE 30, 2014**

**APPENDIX A
MEMBERSHIP INFORMATION**

**Montana Highway Patrol Officers' Retirement System Distribution of
Active Members by Age and Service as of June 30, 2014**

AVERAGE SALARY BY AGE/SERVICE

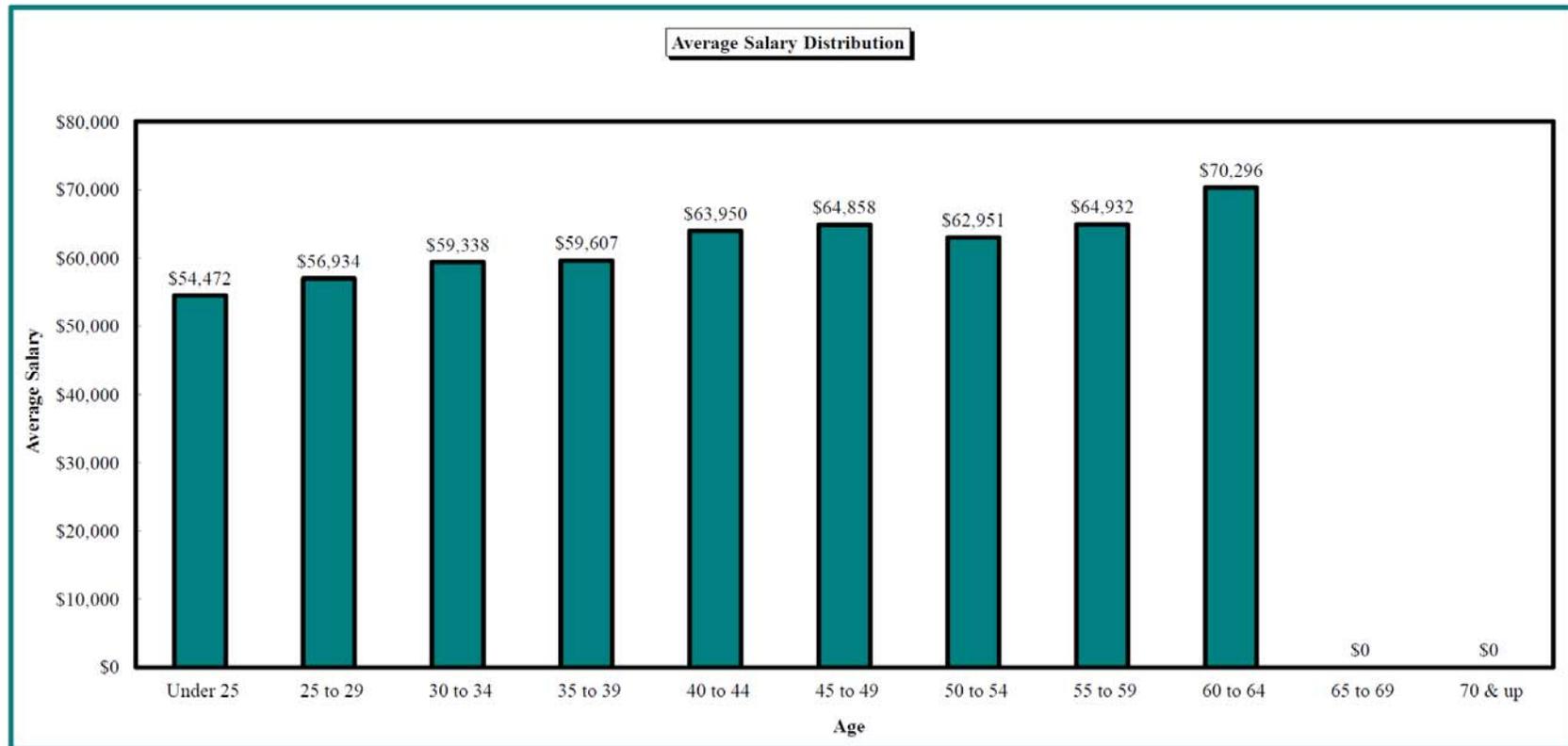
Age	Service										Total
	Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & up	
Under 25	\$54,472	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$54,472
25 to 29	\$54,488	\$57,980	\$70,403	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$56,934
30 to 34	\$54,546	\$56,385	\$60,931	\$80,957	\$0	\$0	\$0	\$0	\$0	\$0	\$59,338
35 to 39	\$55,232	\$56,425	\$58,948	\$61,997	\$0	\$0	\$0	\$0	\$0	\$0	\$59,607
40 to 44	\$0	\$58,175	\$59,514	\$62,831	\$68,096	\$74,251	\$0	\$0	\$0	\$0	\$63,950
45 to 49	\$0	\$54,763	\$59,734	\$62,554	\$65,789	\$72,012	\$0	\$0	\$0	\$0	\$64,858
50 to 54	\$0	\$0	\$57,026	\$60,816	\$65,766	\$67,771	\$73,136	\$0	\$0	\$0	\$62,951
55 to 59	\$0	\$0	\$62,448	\$62,673	\$63,686	\$72,270	\$69,471	\$0	\$0	\$0	\$64,932
60 to 64	\$0	\$54,490	\$0	\$0	\$0	\$0	\$78,719	\$77,677	\$0	\$0	\$70,296
65 to 69	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
70 & up	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total	\$54,529	\$56,598	\$59,896	\$62,937	\$66,534	\$70,987	\$73,615	\$77,677	\$0	\$0	\$61,772

The salary shown in the above chart was used for valuation purposes and assumes pay increases for the year.

MONTANA HIGHWAY PATROL OFFICERS' RETIREMENT SYSTEM
ACTUARIAL VALUATION AS OF JUNE 30, 2014

APPENDIX A
MEMBERSHIP INFORMATION

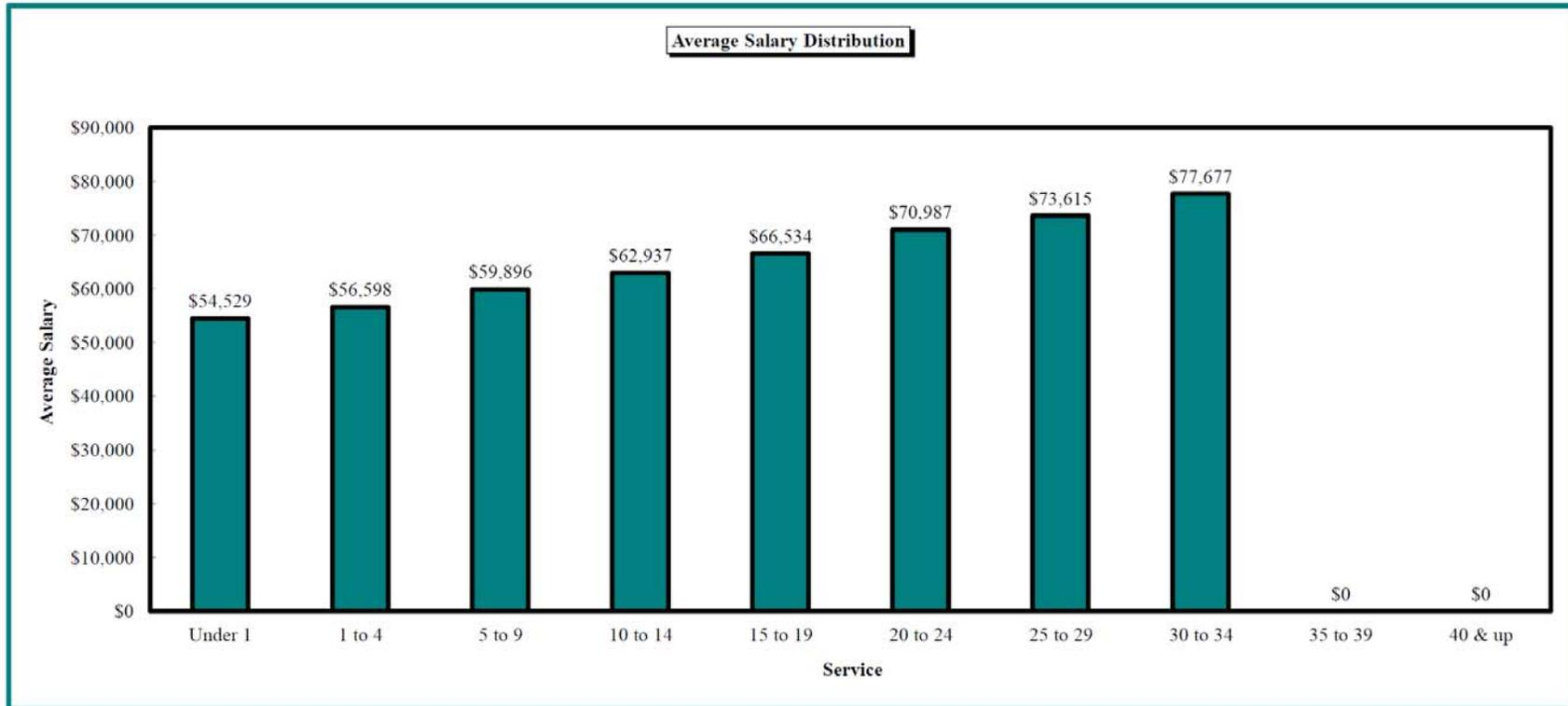
Montana Highway Patrol Officers' Retirement System Distribution of
Active Members by Age as of June 30, 2014



MONTANA HIGHWAY PATROL OFFICERS' RETIREMENT SYSTEM
ACTUARIAL VALUATION AS OF JUNE 30, 2014

APPENDIX A
MEMBERSHIP INFORMATION

Montana Highway Patrol Officers' Retirement System Distribution of
Active Members by Service as of June 30, 2014



**MONTANA HIGHWAY PATROL OFFICERS' RETIREMENT SYSTEM
ACTUARIAL VALUATION AS OF JUNE 30, 2014**

**APPENDIX A
MEMBERSHIP INFORMATION**

**Montana Highway Patrol Officers' Retirement System Distribution of Retired
Members, Survivors, and Disabled Members as of June 30, 2014**

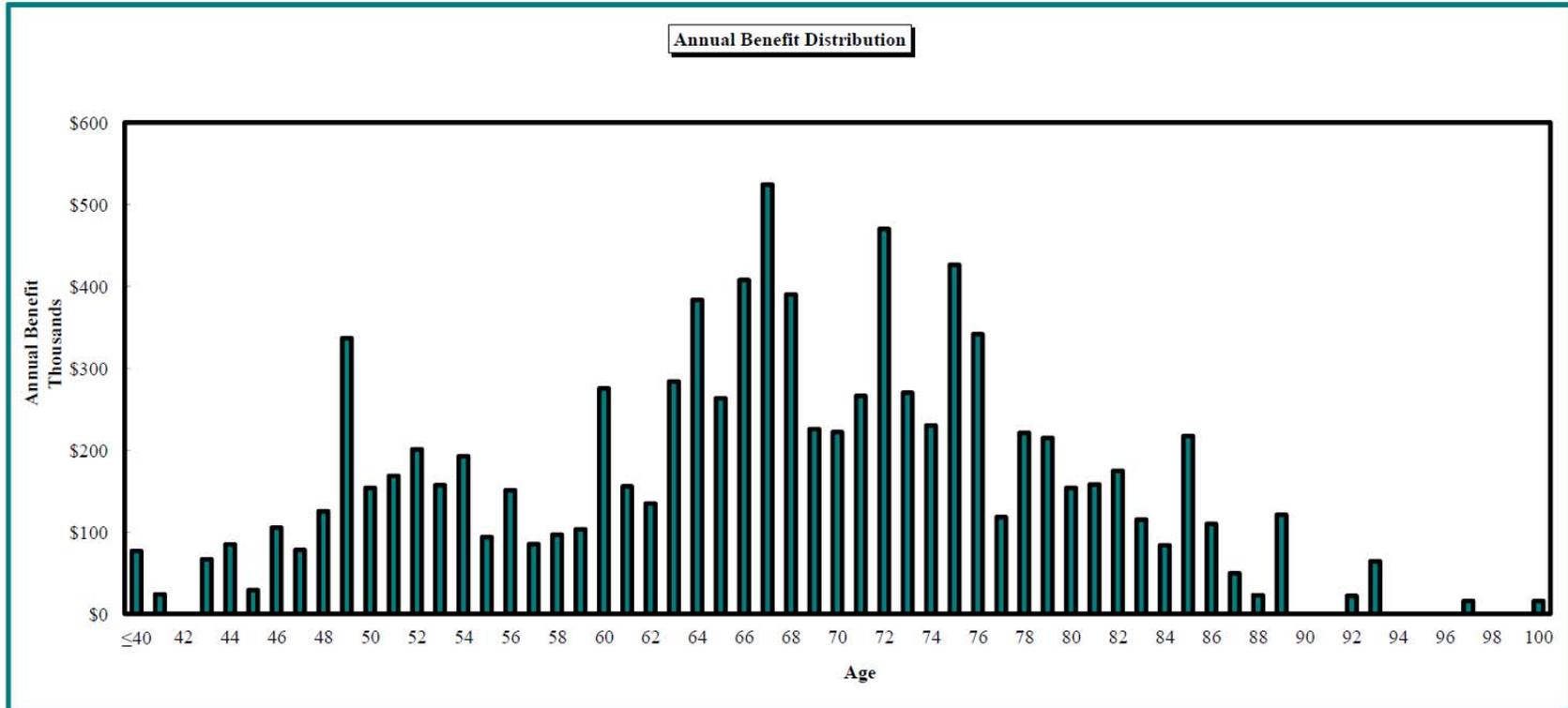
Age	Count	Annual Benefit	Age	Count	Annual Benefit
<25	3	\$2,643	73	9	\$270,031
25	0	\$0	74	8	\$230,248
26	0	\$0	75	13	\$426,002
27	0	\$0	76	12	\$341,500
28	0	\$0	77	4	\$118,076
29	0	\$0	78	9	\$220,846
30	0	\$0	79	9	\$214,757
31	0	\$0	80	7	\$153,927
32	0	\$0	81	7	\$158,121
33	0	\$0	82	8	\$174,861
34	0	\$0	83	5	\$115,239
35	1	\$25,092	84	4	\$83,775
36	1	\$23,957	85	8	\$217,381
37	0	\$0	86	3	\$110,029
38	0	\$0	87	2	\$49,492
39	1	\$25,139	88	1	\$23,095
40	0	\$0	89	5	\$121,157
41	1	\$23,843	90	0	\$0
42	0	\$0	91	0	\$0
43	3	\$66,557	92	1	\$21,992
44	3	\$84,844	93	3	\$64,512
45	1	\$29,107	94	0	\$0
46	3	\$105,265	95	0	\$0
47	2	\$78,164	96	0	\$0
48	4	\$125,529	97	1	\$16,079
49	10	\$336,527	98	0	\$0
50	6	\$154,039	99	0	\$0
51	6	\$168,807	100	1	\$16,084
52	6	\$200,901	101	0	\$0
53	4	\$157,110	102	0	\$0
54	8	\$192,620	103	0	\$0
55	4	\$93,901	104	0	\$0
56	5	\$150,903	105	0	\$0
57	2	\$85,514	106	0	\$0
58	3	\$96,706	107	0	\$0
59	3	\$103,451	108	0	\$0
60	8	\$275,130	109	0	\$0
61	6	\$155,902	110	0	\$0
62	5	\$134,926	111	0	\$0
63	8	\$283,658	112	0	\$0
64	11	\$383,227	113	0	\$0
65	8	\$263,286	114	0	\$0
66	11	\$407,806	115	0	\$0
67	18	\$524,298	116	0	\$0
68	10	\$389,777	117	0	\$0
69	5	\$225,821	118	0	\$0
70	8	\$221,725	119	0	\$0
71	9	\$266,383	120	0	\$0
72	15	\$469,985			
			Totals	322	\$9,479,745

The chart above reflects the counts and benefits used for valuation purposes as a result of data processing. The benefit amounts shown have been projected using a half year COLA assumption.

MONTANA HIGHWAY PATROL OFFICERS' RETIREMENT SYSTEM
ACTUARIAL VALUATION AS OF JUNE 30, 2014

APPENDIX A
MEMBERSHIP INFORMATION

Montana Highway Patrol Officers' Retirement System Distribution of Retired
Members, Survivors, and Disabled Members as of June 30, 2014



**MONTANA HIGHWAY PATROL OFFICERS' RETIREMENT SYSTEM
ACTUARIAL VALUATION AS OF JUNE 30, 2014**

**APPENDIX A
MEMBERSHIP INFORMATION**

**Montana Highway Patrol Officers' Retirement System Distribution of
Terminated Vested Members as of June 30, 2014**

Age	Count	Annual Benefit*	Account Balance*	Age	Count	Annual Benefit*	Account Balance*
<25	0	\$0	\$0	73	0	\$0	\$0
25	0	\$0	\$0	74	0	\$0	\$0
26	0	\$0	\$0	75	0	\$0	\$0
27	0	\$0	\$0	76	0	\$0	\$0
28	0	\$0	\$0	77	0	\$0	\$0
29	0	\$0	\$0	78	0	\$0	\$0
30	1	\$7,374	\$0	79	0	\$0	\$0
31	0	\$0	\$0	80	0	\$0	\$0
32	0	\$0	\$0	81	0	\$0	\$0
33	0	\$0	\$0	82	0	\$0	\$0
34	0	\$0	\$0	83	0	\$0	\$0
35	0	\$0	\$0	84	0	\$0	\$0
36	0	\$0	\$0	85	0	\$0	\$0
37	0	\$0	\$0	86	0	\$0	\$0
38	1	\$6,864	\$0	87	0	\$0	\$0
39	0	\$0	\$0	88	0	\$0	\$0
40	0	\$0	\$0	89	0	\$0	\$0
41	1	\$7,296	\$0	90	0	\$0	\$0
42	1	\$5,161	\$0	91	0	\$0	\$0
43	0	\$0	\$0	92	0	\$0	\$0
44	0	\$0	\$0	93	0	\$0	\$0
45	0	\$0	\$0	94	0	\$0	\$0
46	2	\$27,691	\$12,218	95	0	\$0	\$0
47	0	\$0	\$0	96	0	\$0	\$0
48	0	\$0	\$0	97	0	\$0	\$0
49	0	\$0	\$0	98	0	\$0	\$0
50	0	\$0	\$0	99	0	\$0	\$0
51	2	\$49,133	\$0	100	0	\$0	\$0
52	0	\$0	\$0	101	0	\$0	\$0
53	0	\$0	\$0	102	0	\$0	\$0
54	1	\$0	\$10,367	103	0	\$0	\$0
55	0	\$0	\$0	104	0	\$0	\$0
56	1	\$12,301	\$0	105	0	\$0	\$0
57	1	\$10,961	\$0	106	0	\$0	\$0
58	0	\$0	\$0	107	0	\$0	\$0
59	0	\$0	\$0	108	0	\$0	\$0
60	0	\$0	\$0	109	0	\$0	\$0
61	0	\$0	\$0	110	0	\$0	\$0
62	0	\$0	\$0	111	0	\$0	\$0
63	0	\$0	\$0	112	0	\$0	\$0
64	0	\$0	\$0	113	0	\$0	\$0
65	0	\$0	\$0	114	0	\$0	\$0
66	0	\$0	\$0	115	0	\$0	\$0
67	0	\$0	\$0	116	0	\$0	\$0
68	0	\$0	\$0	117	0	\$0	\$0
69	0	\$0	\$0	118	0	\$0	\$0
70	0	\$0	\$0	119	0	\$0	\$0
71	0	\$0	\$0	120	0	\$0	\$0
72	0	\$0	\$0				
Totals					11	\$126,781	\$22,586

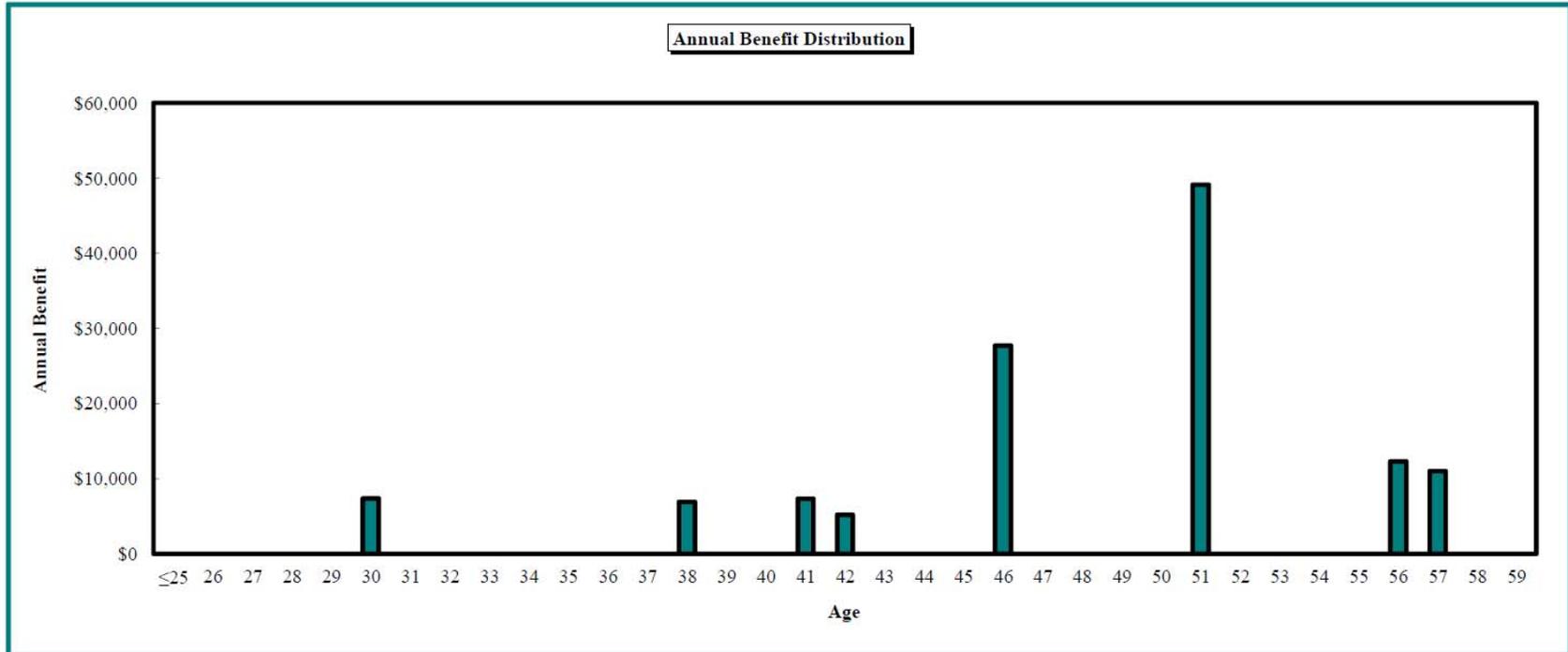
* payable at the greater of age 60 or current age (use current age if member has 20 years of service)

The chart above reflects the counts and benefits used for valuation purposes as a result of data processing.

MONTANA HIGHWAY PATROL OFFICERS' RETIREMENT SYSTEM
ACTUARIAL VALUATION AS OF JUNE 30, 2014

APPENDIX A
MEMBERSHIP INFORMATION

Montana Highway Patrol Officers' Retirement System Distribution of
Terminated Vested Members as of June 30, 2014



**MONTANA HIGHWAY PATROL OFFICERS' RETIREMENT SYSTEM
ACTUARIAL VALUATION AS OF JUNE 30, 2014**

**APPENDIX A
MEMBERSHIP INFORMATION**

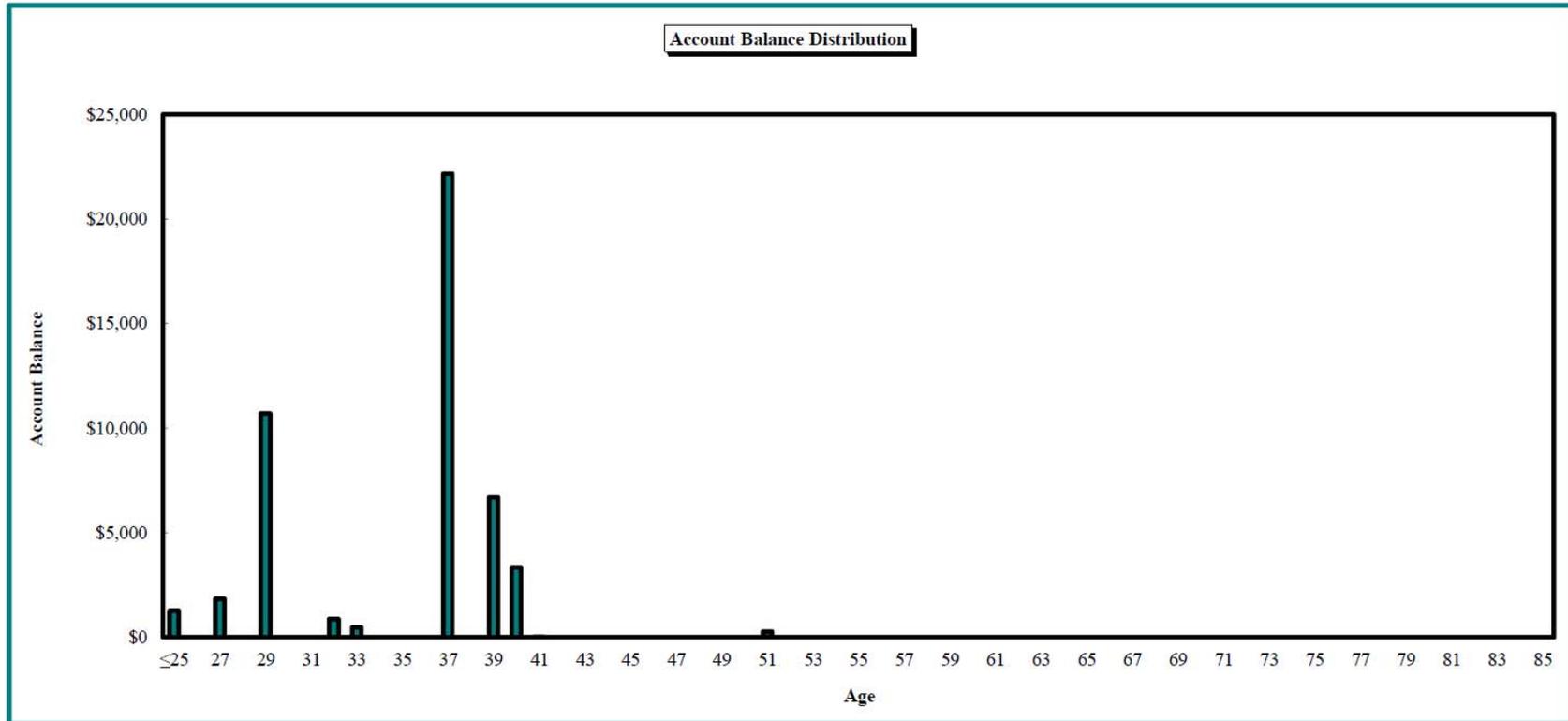
**Montana Highway Patrol Officers' Retirement System Distribution
of Terminated Non-Vested Members as of June 30, 2014**

Age	Count	Account Balance	Age	Count	Account Balance
<25	0	\$0	73	0	\$0
25	1	\$1,272	74	0	\$0
26	0	\$0	75	0	\$0
27	1	\$1,824	76	0	\$0
28	0	\$0	77	0	\$0
29	2	\$10,699	78	0	\$0
30	0	\$0	79	0	\$0
31	0	\$0	80	0	\$0
32	2	\$869	81	0	\$0
33	1	\$472	82	0	\$0
34	0	\$0	83	0	\$0
35	0	\$0	84	0	\$0
36	0	\$0	85	0	\$0
37	2	\$22,160	86	0	\$0
38	0	\$0	87	0	\$0
39	2	\$6,686	88	0	\$0
40	1	\$3,337	89	0	\$0
41	1	\$21	90	0	\$0
42	0	\$0	91	0	\$0
43	0	\$0	92	0	\$0
44	0	\$0	93	0	\$0
45	0	\$0	94	0	\$0
46	0	\$0	95	0	\$0
47	0	\$0	96	0	\$0
48	0	\$0	97	0	\$0
49	0	\$0	98	0	\$0
50	0	\$0	99	0	\$0
51	1	\$267	100	0	\$0
52	0	\$0	101	0	\$0
53	0	\$0	102	0	\$0
54	0	\$0	103	0	\$0
55	0	\$0	104	0	\$0
56	0	\$0	105	0	\$0
57	0	\$0	106	0	\$0
58	0	\$0	107	0	\$0
59	0	\$0	108	0	\$0
60	0	\$0	109	0	\$0
61	0	\$0	110	0	\$0
62	0	\$0	111	0	\$0
63	0	\$0	112	0	\$0
64	0	\$0	113	0	\$0
65	0	\$0	114	0	\$0
66	0	\$0	115	0	\$0
67	0	\$0	116	0	\$0
68	0	\$0	117	0	\$0
69	0	\$0	118	0	\$0
70	0	\$0	119	0	\$0
71	0	\$0	120	0	\$0
72	0	\$0			
			Totals	14	\$47,609

MONTANA HIGHWAY PATROL OFFICERS' RETIREMENT SYSTEM
ACTUARIAL VALUATION AS OF JUNE 30, 2014

APPENDIX A
MEMBERSHIP INFORMATION

Montana Highway Patrol Officers' Retirement System Distribution of
Terminated Non-Vested Members as of June 30, 2014



**APPENDIX B
 ACTUARIAL ASSUMPTIONS AND METHODS**

A. Long-Term Assumptions Used to Determine Plan Costs and Liabilities

1. Demographic Assumptions

a. Healthy Retirees, Beneficiaries and Non-Retired Members

Male and Female RP-2000 Combined Employee and Annuitant Mortality Tables. To reflect mortality improvements since the date of the table and to project future mortality improvements, the tables are projected to 2015 using scale AA.

Sample Rates of Healthy Mortality		
Age	Male	Female
50	0.163%	0.130%
55	0.272%	0.241%
60	0.530%	0.469%
65	1.031%	0.900%
70	1.770%	1.553%
75	3.062%	2.492%
80	5.536%	4.129%
85	9.968%	7.076%
90	17.271%	12.588%

70% of deaths from active service are assumed to be duty related.

b. Disabled Inactive Mortality

Male and Female RP-2000 Combined Employee and Annuitant Mortality Tables with no projections. No future mortality improvement is assumed.

Sample Rates of Disabled Inactive Mortality		
Age	Male	Female
50	0.214%	0.168%
55	0.362%	0.272%
60	0.675%	0.506%
65	1.274%	0.971%
70	2.221%	1.674%
75	3.783%	2.811%
80	6.437%	4.588%
85	11.076%	7.745%
90	18.341%	13.168%

MONTANA HIGHWAY PATROL OFFICERS' RETIREMENT SYSTEM
ACTUARIAL VALUATION AS OF JUNE 30, 2014

**APPENDIX B
ACTUARIAL ASSUMPTIONS AND METHODS**

c. Rates of Active Disability

Sample Rates of Active Disability	
Age	Rate
22	0.00%
27	0.10%
32	0.10%
37	0.10%
42	0.40%
47	0.40%
52	0.40%
57	0.40%
62	0.00%

75% of all disabilities are assumed to be duty related, and all disabilities are assumed to be permanent and without recovery.

d. Termination of Employment (Prior to Normal Retirement Eligibility)

Service	Rate
0	12.0%
1 – 4	7.5%
5 – 9	5.0%
10 – 14	3.0%
15 & over	1.0%

e. Probability of Electing a Refund of Member Contributions upon Termination

Age at Term.	Probability of Electing Refund	
	Non-Vested	Vested
Under 35	100%	40%
35-39	100%	40%
40-44	100%	40%
45-49	100%	30%
50 & Over	100%	0%

MONTANA HIGHWAY PATROL OFFICERS' RETIREMENT SYSTEM
ACTUARIAL VALUATION AS OF JUNE 30, 2014

**APPENDIX B
ACTUARIAL ASSUMPTIONS AND METHODS**

f. Retirement

Annual Retirement Rates	
Age	20 years or more
<50	12.00%
50 – 54	16.00%
55 – 59	20.00%
60 & over	100.00%

Vested terminations are assumed to retire at their earliest unreduced eligibility.

g. Merit/Seniority Salary Increase (in addition to across-the-board increase)

Service based table plus an annual inflation rate of 4.00% (rates shown below exclude amount for inflation).

Service	Annual Increase
1	7.3%
2	5.6%
3	4.4%
4	3.5%
5	2.8%
6	2.2%
7	1.7%
8	1.3%
9	1.0%
10	0.7%
11-15	0.4%
16-20	0.2%
21 & over	0.0%

h. Family Composition

Female spouses are assumed to be three years younger than males.

100% of non-retired employees are assumed married for both male and female employees.

Actual marital characteristics are used for pensioners.

APPENDIX B
ACTUARIAL ASSUMPTIONS AND METHODS

i. Vested Benefits for Terminated Members

Vested benefits for members who terminated during the years ending June 30, 2009 and later were estimated based upon compensation and service information in the census data. For members who terminated prior to June 30, 2008, vested benefits valued were the same as had been calculated by the prior actuary for the June 30, 2008 actuarial valuation.

2. Economic Assumptions

a. Rate of Investment Return:	7.75% (net of investment expenses)
b. Rate of Wage Inflation:	4.00% (3.00% inflation plus 1.00% real wage growth)
c. Interest on Member Contributions:	3.50%
d. Rate of Increase in Total Payroll	4.00% (for amortization and non-GABA post retirement increases)
e. Administrative Expenses as a Percentage of Payroll	0.23%

3. Changes since Last Valuation

The administrative expense assumption is now explicitly stated as a cost element rather than being included implicitly within the investment return.

APPENDIX B
ACTUARIAL ASSUMPTIONS AND METHODS

B. Actuarial Methods

1. Funding Method

The Entry Age Normal Actuarial Cost method is used to determine costs. Under this funding method, a normal cost is determined as a level percent of pay individually for each active employee.

The actuarial liability is that portion of the present value of projected benefits that will not be paid by future normal costs. The difference between this liability and funds accumulated as of the same date is referred to as the unfunded actuarial liability.

The portion of the actuarial liability in excess of Plan assets is amortized to develop an additional cost or savings which is added to each year's employer normal cost. Under this cost method, actuarial gains and losses are directly reflected in the size of the unfunded actuarial liability.

2. Actuarial Value of Assets

For purposes of determining the unfunded actuarial liability, we use an actuarial value of assets. The asset adjustment method dampens the volatility in asset values that could occur because of fluctuations in market conditions. Use of an asset smoothing method is consistent with the long-term nature of the actuarial valuation process.

The actuarial value of assets is the current market value, adjusted by a four-year smoothing of gains and losses on a market value basis. Each year's gain or loss is determined as the difference between the actual market return and the expected market return using the assumed rate of investment return.

3. Amortization Method

The unfunded actuarial liability is amortized as a level percentage of future payroll. The valuation determines the period over which the statutory contributions will fully amortize the unfunded actuarial liability.

4. Changes since Last Valuation

None.

APPENDIX C
SUMMARY OF PLAN PROVISIONS

1. Membership

The plan is a single employer defined benefit plan that covers all members of the Montana Highway Patrol including supervisors and assistant supervisors.

2. Contributions

For members not covered by a Guaranteed Annual Benefit Adjustment (GABA), members contribute 10% of their compensation, an increase of 1% from 9% prior to July 1, 2013. Members covered by GABA contribute 10.05% of their compensation, an increase of 1% from 9.05% prior to July 1, 2013. Member contributions increase 1% annually through the fiscal year ending 2016. Interest is credited at rates determined by the Board.

Member contributions are made through an “employer pick-up” arrangement which results in deferral of taxes on the contributions.

The employer contributes 28.15% of each member’s compensation, an increase of 2% from 26.15% prior to July 1, 2013.

The State of Montana contributes 10.18% of each member’s compensation, paid from the General Fund.

3. Service Credit

Service used to determine the amount of retirement benefit. One month of service credit is earned for each month where the member is paid for 160 hours. This includes certain transferred and purchased service.

4. Membership Service

Service used to determine eligibility for vesting, retirement, or other HPORS benefits. One month of membership service is earned for any month member contributions are made to HPORS regardless of hours worked.

APPENDIX C
SUMMARY OF PLAN PROVISIONS

5. Highest Average Compensation (HAC)

Highest Average Compensation (HAC) is the average of the highest 36 consecutive months (or shorter period of total service) of compensation paid to the member. Compensation is specifically defined in law.

For members hired on or after July 1, 2013: Highest Average Compensation calculations initially exclude amounts over 110% of the compensation included for each previous year with this excess compensation, if any, divided by the member's total months of service credit and added to the compensation for each month considered part of the member's HAC.

Bonuses paid on or after July 1, 2013 to any member will not be treated as compensation for retirement purposes. No member or employer contributions will be paid on bonuses.

6. Service Retirement

Eligibility: 20 years of membership service.

Benefit: 2.6% of highest average compensation times years of service credit.

7. Early Retirement

Eligibility: Age 50 with five years of membership service; if discontinued from service other than for cause.

Benefit: Normal retirement benefit calculated using highest average compensation and service credit at early retirement, and reduced to the actuarial equivalent based on a retirement age of 60.

8. Disability Benefit

Eligibility: Any active member.

Benefit: (i) For duty-related disability:

(a) If less than 20 years of membership service: 50% of highest average compensation

(b) If 20 years or more of membership service: 2.6% of highest average compensation multiplied by years of service credit.

(ii) For regular disability, the actuarial equivalent of the normal retirement benefit based on retirement age of 60.

APPENDIX C
SUMMARY OF PLAN PROVISIONS

9. Survivor's Benefit

Eligibility: Active or retired member.

Benefit: For duty-related deaths, a monthly survivor benefit to the surviving spouse or dependent child equal to 50% of highest average compensation of the member.

For non-duty-related deaths, the member's spouse will receive (or, if there is no surviving spouse or after the surviving spouse dies, each dependent child for as long as they remain dependent children will equally receive) a benefit that is the actuarial equivalent of the early retirement benefit.

A beneficiary may elect to receive the present value of a monthly benefit as a single lump sum.

For retired members without a surviving spouse or dependent child, the member's designated beneficiary will receive a payment equal to the retired member's accumulated contributions reduced by any retirement benefits already paid.

10. Vesting

Eligibility: For members hired prior to July 1, 2013: Five years of membership service.

For members hired on or after July 1, 2013: 10 years of membership service.

Benefit: Accrued normal retirement benefit, payable at normal or early retirement date. In lieu of a pension, a member may receive a refund of accumulated contributions. Upon receipt of a refund of contributions, a member's vested right to a monthly benefit shall be forfeited.

11. Withdrawal of Employee Contributions

Eligibility: Terminates service and is not eligible for other benefits.

Benefit: Accumulated member contributions. Upon receipt of a refund of contributions, a member's vested right to a monthly annuity is forfeited.

12. Form of Payment

The retirement benefit is paid for the retired member's life. Upon the death of the retired member, the benefit is paid to the surviving spouse. If there is no surviving spouse, or after the death of a surviving spouse, benefits are paid to the dependent children, if any, for as long as they remain dependent children.

APPENDIX C
SUMMARY OF PLAN PROVISIONS

13. Post Retirement Benefit Increases

For retired members who became active members on or after July 1, 1997 and those who elected to be covered under this provision, and who have been retired at least 12 months, a GABA will be paid each year in January equal to 3%.

For retired members who were hired prior to July 1, 1997 and who did not elect GABA, the minimum monthly benefit is provided equal to 2% times service credit multiplied by the current base compensation of a probationary highway patrol officer. Such benefit may not exceed 60% of the current base compensation of a probationary highway patrol office, and the annual increase may not exceed 5% of the current benefit.

For non-GABA members who retired prior to July 1, 1991 and meet eligibility requirements, a supplemental lump sum payment will be made each year based on the increase in the Consumer Price Index.

For retired members who became active members on or after July 1, 2013, and who have been retired at least 36 months, a GABA will be paid each year in January equal to 1.5%.

14. Changes since Last Valuation

None.

**APPENDIX D
GLOSSARY**

1. Actuarial Assumptions

Assumptions as to the occurrence of future events affecting pension costs, such as: mortality, withdrawal, disability, and retirement; changes in compensation; inflation; rates of investment earnings, and asset appreciation or depreciation; and other relevant items.

2. Actuarial Cost Method

A procedure for determining the Actuarial Present Value of pension plan benefits and expenses and for developing an allocation of such value to each year of service, usually in the form of a Normal Cost and an Actuarial Liability.

3. 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.

4. Actuarial Liability

The portion of the Actuarial Present Value of Projected Benefits which will not be paid by future Normal Costs. It represents the value of the past Normal Costs with interest to the valuation date.

5. Actuarial Present Value (Present Value)

The value as of a given date of a future amount or series of payments. The Actuarial Present Value discounts the payments to the given date at the assumed investment return and includes the probability of the payment being made. As a simple example: assume you owe \$100 to a friend one year from now. Also, assume there is a 1% probability of your friend dying over the next year, in which case you won't be obligated to pay him. If the assumed investment return is 10%, the actuarial present value is as follows:

$$\begin{array}{ccccccc} \text{Amount} & & \text{Probability of} & & \text{1/(1+Investment} & & \\ & & \text{Payment} & & \text{Return)} & & \\ & & (1 - .01) & & 1/(1+.1) & & \\ \$100 & \times & & \times & & = & \$90 \end{array}$$

6. Actuarial Valuation

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

**APPENDIX D
GLOSSARY**

7. 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. The purpose of an Actuarial Value of Assets is to smooth out fluctuations in market values. This way, long-term costs are not distorted by short-term fluctuations in the market.

8. Actuarially Equivalent

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

9. Amortization Payment

The portion of the pension plan contribution which is designed to pay interest and principal on the Unfunded Actuarial Liability in order to pay for that liability in a given number of years.

10. Entry Age Normal Actuarial Cost Method

A method under which the Actuarial Present Value of the 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.

11. Funded Percentage

The ratio of the Actuarial Value of Assets to the Actuarial Liabilities.

12. Inflation (CPI)

The assumed increase in dollar related values in the future due to the general increase in the cost-of-living. The usual measure for inflation is the Consumer Price Index (CPI).

13. Investment Return Assumption

The assumed interest rate used for projecting dollar related values in the future.

14. Mortality Table

A set of percentages which estimate the probability of death at a particular point in time. Typically, the rates are annual and based on age and gender.

**APPENDIX D
GLOSSARY**

15. 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.

16. Projected Benefits

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

17. Unfunded Actuarial Liability

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