**Montana Municipal Police Officers'
Retirement System
of the
State of Montana**

**Actuarial Valuation
as of June 30, 2013**

Produced by Cheiron

October 2013

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CHEIRON

October 31, 2013

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 Municipal Police Officers' Retirement System as of June 30, 2013. 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 discloses employer contribution levels, and required disclosures under the Governmental Accounting Standards Board Statement No. 25. The purpose of this report is to present the annual actuarial valuation of the Montana Municipal Police 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 2013 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 Municipal Police 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   Margaret Tempkin, FSA
Principal Consulting Actuary   Principal Consulting Actuary

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FOREWORD

Cheiron has performed the Actuarial Valuation of the Montana Municipal Police Officers' Retirement System as of June 30, 2013. 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 2013 to meet the requirements of an Annual Required Contribution (ARC) under GASB 25; and

4) **Provide specific information** and documentation required by the Governmental Accounting Standards Board (GASB).

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 the required disclosures under GASB Statement No. 25.

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 valuations.

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.

SECTION I
BOARD SUMMARY

General Comments

This is the fifth valuation of the Montana Municipal Police Officers' Retirement System performed by Cheiron.

The period to amortize unfunded actuarial liability decreased from 25.7 years at the June 30, 2012 valuation to 23.8 years as of June 30, 2013. During the year ended June 30, 2013, the System's assets gained 12.42% 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 11.08%. This return was above the assumed rate of return of 7.75% and resulted in an actuarial gain on investments of $7.8 million.

The System also experienced an actuarial gain 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 gain related to experience released $0.5 million from the actuarial liability. This type of activity is normal in the course of system 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.

House Bill 97, effective July 1, 2013 and pertaining to member compensation, had no impact on the June 30, 2013 actuarial valuation.

As of the June 30, 2013 Actuarial Valuation, the System's unfunded actuarial liability was $187.4 million. This is a decrease from last year's unfunded actuarial liability of $193.2 million. The funded ratio was 55% at the prior valuation and increased to 58% at June 30, 2013.

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, 2013 was $8.3 million greater than actuarial value. If market value were used rather than actuarial value, the funded ratio on the valuation date would be 60%, and the amortization period for the unfunded actuarial liability would be 22.2 years.

This report does not reflect any changes in pension accounting requirements from newly issued GASB Statements Nos. 67 and 68. Statement No. 67 will be effective for the plan year ending June 30, 2014. Statement No. 68 will be effective for most employers' fiscal years ending June 30, 2015. All references and calculations with respect to GASB reflect current Statements Nos. 25 and 27. In addition, in accordance with the System's funding policy, the contribution levels are compared to an amount that would satisfy the requirements for an Annual Required Contribution (ARC) under GASB No. 25. Since the concept of the ARC will disappear when GASB Nos. 67 and 68 become effective, the System may need to define a different calculation basis for measuring funding sufficiency.

SECTION I
BOARD SUMMARY

Trends

Assets and Liabilities

The market value of assets (MVA) increased over last year, gaining 12.42% 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 differs from the assumed rate of 7.75%.

Over the period July 1, 2008 to June 30, 2013 the System's assets returned approximately 2.8% 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.
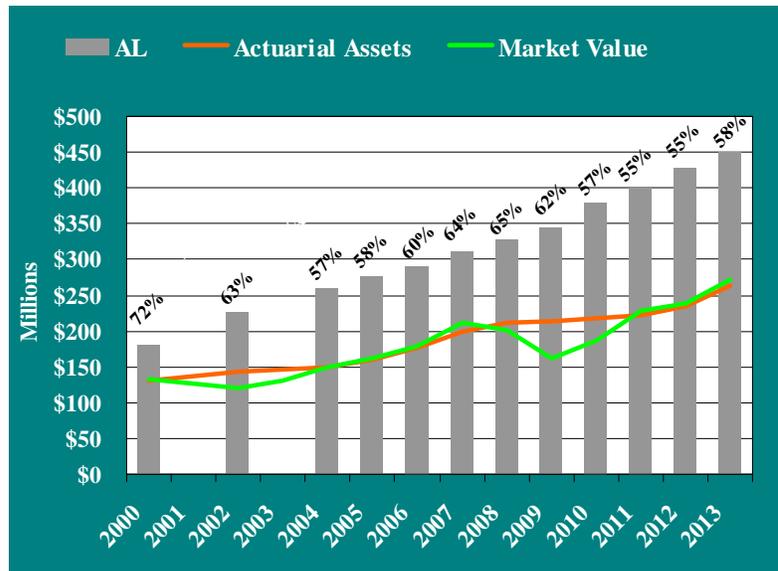
Contribution Rates

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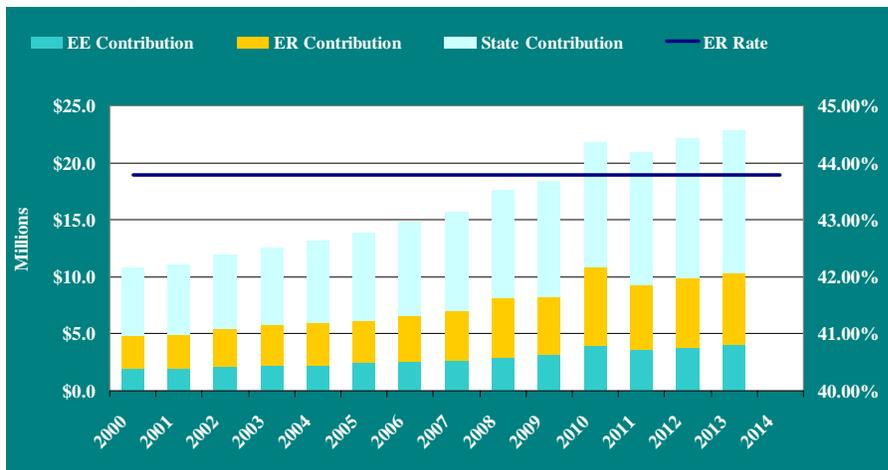
The employer and member contribution rates are set by State law. The actuarial valuation determines the extent to which the statutory contributions will meet the requirements of funding the System.

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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 at approximately 1.0 actives for each inactive from 2000 through today.

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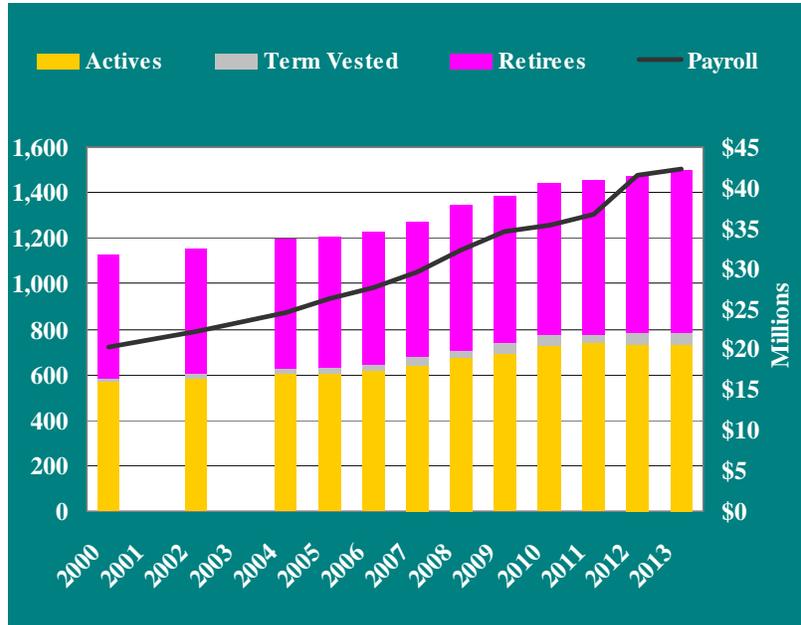
Net Cash Flow

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).
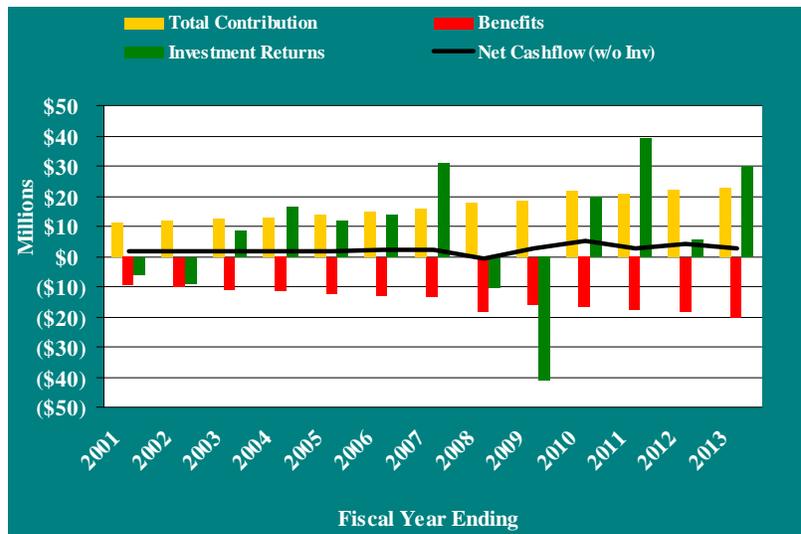
SECTION I
BOARD SUMMARY

Future Outlook

Base Line Projections

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

The chart below shows the funded status of the System is expected to increase gradually over the next 15 years reaching 86% funded by 2028.
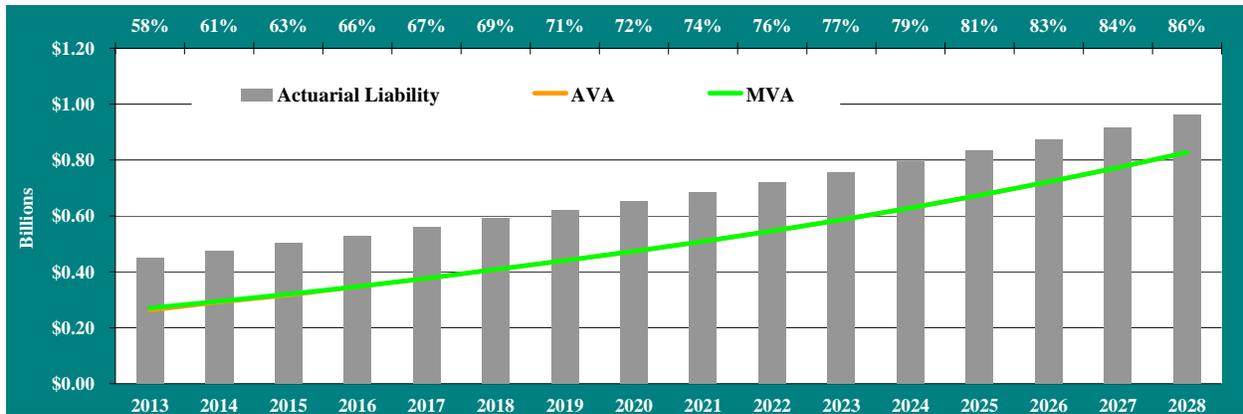
The chart below shows that the statutory contribution exceeds the GASB minimum contribution for the entire 15-year period and the GASB Annual Required Contribution decreases gradually throughout the period.
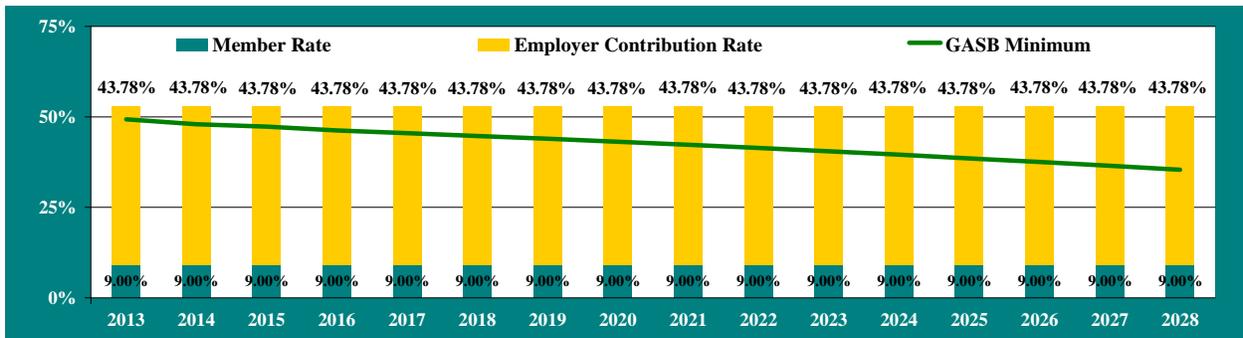
SECTION I
BOARD SUMMARY

Projections with Asset Returns of 9.25%

The future funding status of this System will be largely driven by the investment earnings. Due to the size of assets, as compared to liabilities, the System is in a highly leveraged position. This means that relatively minor changes in market returns 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).
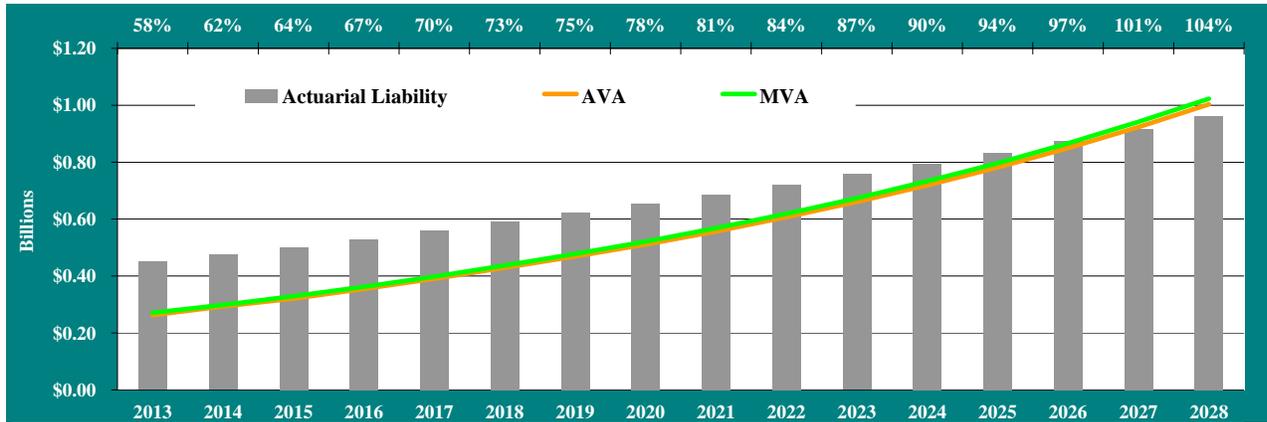
Compared to the baseline projections, the funded status is expected to improve more rapidly than the baseline, reaching 100% by 2027. The GASB Annual Required Contribution drops below 25% by the end of the 15-year period.
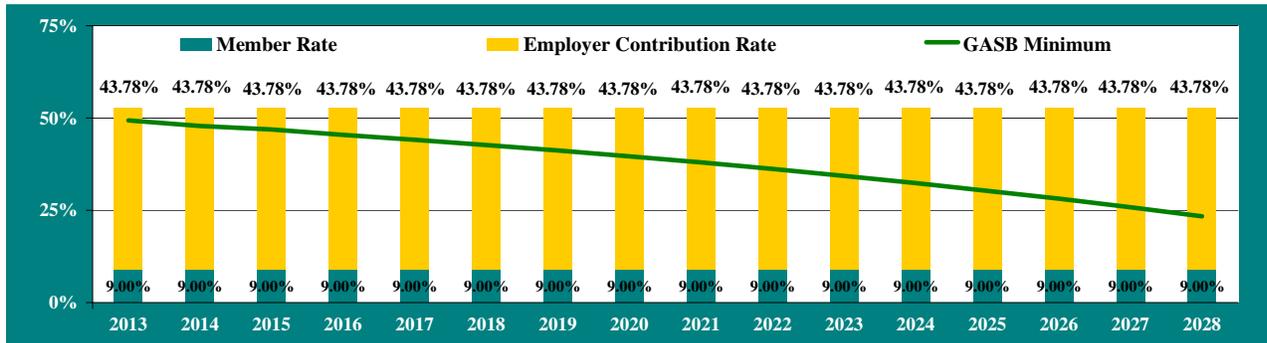
SECTION I
BOARD SUMMARY

<u>Projections with Asset Returns of 6.25%</u>

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).
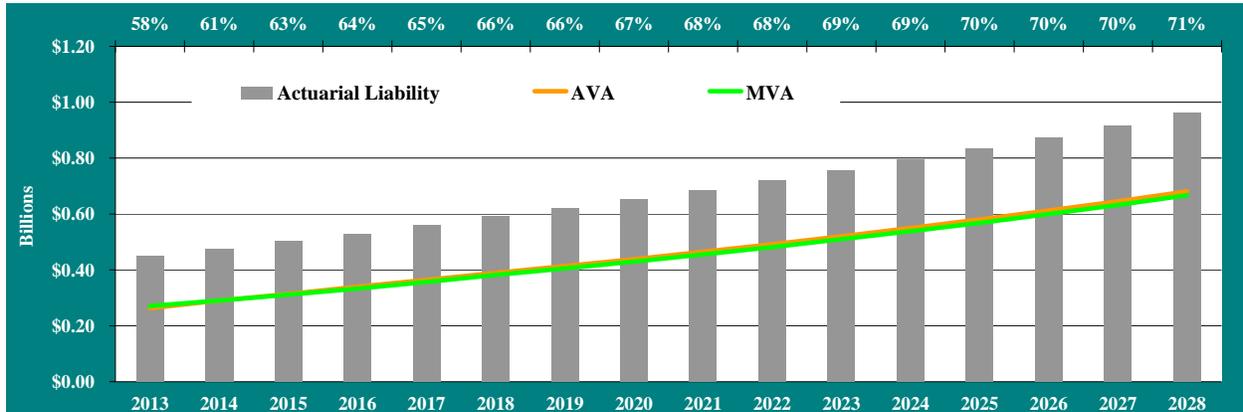
Under this scenario the funded status still improves but to a much lesser extent than for the baseline. The GASB Annual Required Contribution remains slightly below the statutory contribution rate.
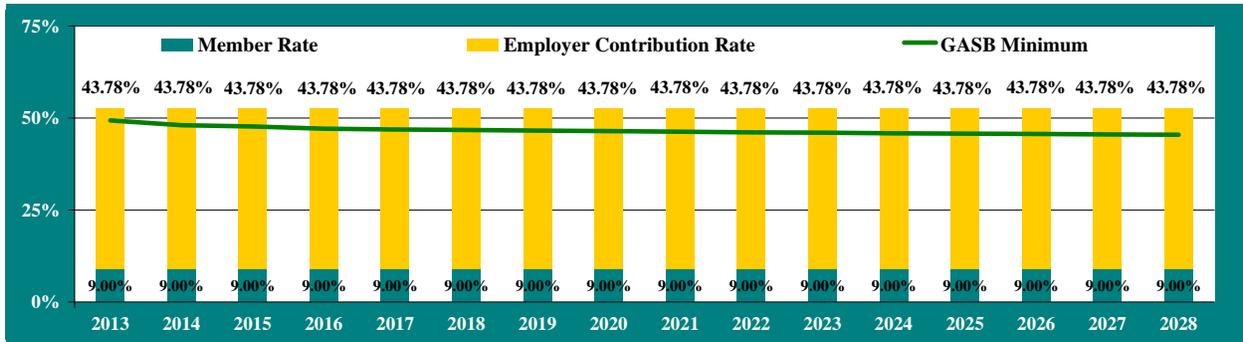
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SECTION I
BOARD SUMMARY

Table I-1 Montana Municipal Police Officers' Retirement System Summary of Principal System Results			
Valuation as of:	**June 30, 2012**	**June 30, 2013**	**% Change**
Participant Counts			
Active Members*	736	734	(0.3%)
Disabled Members**	20	20	0.0%
Retirees and Beneficiaries**	663	690	4.1%
Terminated Vested Members	49	52	6.1%
Terminated Non-Vested Members	76	77	1.3%
Total***	1,544	1,573	1.9%
Annual Salaries of Active Members	$ 41,584,304	$ 42,323,994	1.8%
Average Annual Salary	$ 56,500	$ 57,662	2.1%
Annual Retirement Allowances for Retired Members and Beneficiaries	$ 17,664,959	$ 18,948,346	7.3%
Assets and Liabilities			
Actuarial Liability (AL)	$ 427,257,330	$ 450,043,289	5.3%
Actuarial Value of Assets (AVA)	234,025,065	262,678,031	12.2%
Unfunded AL	$ 193,232,265	$ 187,365,258	(3.0%)
Funded Ratio (AVA/AL)	54.8%	58.4%	
Present Value of Accrued Benefits (PVAB)	$ 359,929,947	$ 382,950,980	6.4%
Market Value of Assets	238,636,453	271,009,167	13.6%
Unfunded PVAB	$ 121,293,494	$ 111,941,813	(7.7%)
Accrued Benefit Funding Ratio	66.3%	70.8%	
Ratio of Actuarial Value to Market Value	98.1%	96.9%	
Contributions as a Percentage of Payroll			
Statutory Funding Rate	52.78%	52.78%	
Normal Cost Rate	26.26%	26.29%	
Available for Amortization of UAL	26.52%	26.49%	
Period to Amortize	25.7 years	23.8 years	
Projected 30-year Level Funding Rate	50.46%	49.34%	
Projected Shortfall (Surplus)	(2.32%)	(3.44%)	

*   Includes 35 DROP members as of June 30, 2012 and 36 DROP members as of June 30, 2013.
**   Based on PERA categorization for the annual report. For actuarial valuation purposes, 90 members in 2012 and 88 members in 2013 were valued as disabled members with offsetting reductions to the number of retired members.
*** A reconciliation of counts for the annual report and counts for the valuation 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, 2012 and June 30, 2013;
- 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.

SECTION II
ASSETS

Table II-1 Changes in Market Values		
Value of Assets – June 30, 2012	**$**	**238,636,453**
Additions		
Member Contributions	$ 4,025,673	
Employer Contributions	6,279,941	
State Contributions	12,572,545	
Investment Return	30,036,948	
Other	3,789	
Total Additions	**$ 52,918,896**	
Deductions		
Benefit Payments	$ 20,300,452	
Administrative Expenses	245,730	
Total Deductions	**$ 20,546,182**	
Value of Assets – June 30, 2013	**$**	**271,009,167**

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, 2013 valuation.

Table II-2 Market Value Gain/(Loss)	
Value of Assets – June 30, 2012	$ 238,636,453
Total Contributions	22,881,948
Benefit Payments	(20,300,452)
Expected Return at 7.75%	18,592,492
Expected Value at June 30, 2013	$ 259,810,441
Actual Value at June 30, 2013	$ 271,009,167
Investment Gain/(Loss)	$ 11,198,726

Table II-3 Develop Excluded Gain/(Loss)	Total Gain/(Loss)	Excluded Portion
Exclude 75% of 2013 Gain/(Loss)	$ 11,198,726	$ 8,399,045
Exclude 50% of 2012 Gain/(Loss)	$ (12,365,161)	$ (6,182,581)
Exclude 25% of 2011 Gain/(Loss)	$ 24,458,687	$ 6,114,672
Total Excluded Gain/(Loss) for AVA Calculation		$ 8,331,136

Table II-4 Actuarial Value of Assets	
Market Value of Assets – June 30, 2013	$ 271,009,167
Total Gain/(Loss) excluded	8,331,136
Actuarial Value of Assets – June 30, 2013	$ 262,678,031

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SECTION II
ASSETS

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Investment Performance

The market value of assets (MVA) returned 12.42% during the fiscal year ended 2013, which is more than the assumed 7.75% return. A return of 11.08% 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.

Table II-5 Annual Rates of Return		
Year Ending June 30,	**Market Value**	**Actuarial Value**
2005	7.84%	5.46%
2006	8.65%	9.00%
2007	17.36%	11.41%
2008	(4.86%)	7.32%
2009	(20.32%)	(0.25%)
2010	12.02%	(0.96%)
2011	20.72%	0.59%
2012	2.40%	3.71%
2013	12.42%	11.08%

Table II-6 Projection of System's Benefit Payments and Contributions (in thousands)					
Year Beginning July 1,	**Expected Benefits**	**Expected Contributions***	**Net Cash Flow (excluding Investment Return)**	**Expected Investment Return****	**Net Cash Flow (including Investment Return)**
2013	$ 21,383	$ 23,680	$ 2,297	$ 21,091	$ 23,388
2014	21,971	24,627	2,656	22,917	25,573
2015	23,047	25,612	2,565	24,895	27,460
2016	24,144	26,636	2,492	27,021	29,513
2017	25,210	27,702	2,492	29,308	31,800
2018	28,801	28,810	9	31,678	31,687
2019	30,986	29,962	(1,024)	34,094	33,070
2020	32,374	31,161	(1,213)	36,650	35,437
2021	34,142	32,407	(1,735)	39,377	37,642
2022	35,823	33,704	(2,119)	42,279	40,160

* Expected contributions include Employer Contributions, State Contributions, and Member Contributions. For illustration purposes, we have assumed that all contribution rates will remain level 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, 2013. 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 the System's liabilities at June 30, 2012 and June 30, 2013;
- 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 12-2-407.

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, assuming participants continue to accrue benefits and all of our 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 type, a **net surplus** or an **unfunded liability**.

SECTION III
LIABILITIES

Table III-1 Liabilities/Net (Surplus)/Unfunded				
		June 30, 2012		**June 30, 2013**
Present Value of Benefits				
Active Participant Benefits	$	259,159,310	$	263,785,387
Retiree and Inactive Benefits		255,074,782		275,479,415
Present Value of Benefits (PVB)	$	**514,234,092**	$	**539,264,802**
Market Value of Assets (MVA)	$	238,636,453	$	271,009,167
Future Member Contributions		29,036,967		29,747,715
Future Employer Contributions		141,248,713		144,706,107
Funding Shortfall/(Surplus)		105,311,959		93,801,813
Total Resources	$	**514,234,092**	$	**539,264,802**
Actuarial Liability				
Present Value of Benefits (PVB)	$	514,234,092	$	539,264,802
Present Value of Future Normal Costs (PVFNC)		86,976,762		89,221,513
Actuarial Liability (AL=PVB–PVFNC)		**427,257,330**		**450,043,289**
Actuarial Value of Assets (AVA)		234,025,065		262,678,031
Net (Surplus)/Unfunded (AL – AVA)	$	**193,232,265**	$	**187,365,258**
Present Value of Accrued Benefits				
Present Value of Benefits (PVB)	$	514,234,092	$	539,264,802
Present Value of Future Benefit Accruals (PVFBA)		154,304,145		156,313,822
Present Value of Accrued Benefits (PVAB=PVB–PVFBA)		**359,929,947**		**382,950,980**
Market Value of Assets (MVA)		238,636,453		271,009,167
Net Unfunded (PVAB – MVA)	$	**121,293,494**	$	**111,941,813**

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 increasing 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 **Present Value of Benefits**	**Actuarial Liability**	**Present Value of Accrued Liability**
Liabilities June 30, 2012	$ 514,234,092	$ 427,257,330	$ 359,929,947
Liabilities June 30, 2013	539,264,802	450,043,289	382,950,980
Liability			
Increase (Decrease)	25,030,710	22,785,959	23,021,033
Change Due to:			
Actuarial (Gain)/Loss	NC*	(453,811)	NC*
Plan Changes	0	0	0
Benefits Accumulated and			
Other Sources	25,030,710	23,239,770	23,021,033

 * NC = not calculated.

Table III-3
Summary of Actuarial Gains and Losses as of June 30, 2013

Actuarial Liabilities as of July 1, 2012	$ 427,257,330
Normal Cost	10,407,786
Actual Benefit Payments	(20,300,452)
Interest	33,132,436
Expected Actuarial Liability as of July 1, 2013	450,497,100
Actual Liability as of July 1, 2013	$ 450,043,289
Liability (Gain)/Loss	$ (453,811)
Sources of Liability (Gain)/Loss	
Salary (Gain)/Loss	$ (1,641,670)
New Participant (Gain)/Loss	453,609
Active Retirements (Gain)/Loss	(3,058,647)
Active Terminations (Gain)/Loss	224,017
Active Deaths (Gain)/Loss	(162,920)
Active Disability (Gain)/Loss	(274,530)
Inactive Mortality (Gain)/Loss	217,385
Other (Gain)/Loss	3,788,945
Actual Liability as of July 1, 2013	$ 450,043,289
Liability (Gain)/Loss due to plan changes	$ 0
Actuarial Value of Assets as of July 1, 2012	$ 234,025,065
Net Cash Flow	2,581,496
Expected Earnings	18,235,109
Expected Actuarial Value of Assets as of July 1, 2013	254,841,670
Actual Actuarial Value of Assets as of July 1, 2013	$ 262,678,031
Investment (Gain)/Loss	$ (7,836,361)
Total Liability (Gain)/Loss	(453,811)
Total Actuarial (Gain)/Loss	$ (8,290,172)

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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, 2012	**June 30, 2013**
1. Actuarial Liabilities		
Retiree and Inactive Benefits	$ 255,074,782	$ 275,479,415
Active Member Benefits	172,182,548	174,563,874
Total Actuarial Liability	**$ 427,257,330**	**$ 450,043,289**
2. Actuarial Value of Assets	$ 234,025,065	$ 262,678,031
3. Unfunded Actuarial Liability	$ 193,232,265	$ 187,365,258
4. Funded Ratio	54.8%	58.4%

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, 2012	**June 30, 2013**
1. Actuarial Liabilities		
Retiree and Inactive Benefits	$ 255,074,782	$ 275,479,415
Active Member Benefits	172,182,548	174,563,874
Total Actuarial Liability	**$ 427,257,330**	**$ 450,043,289**
2. Market Value of Assets	$ 238,636,453	$ 271,009,167
3. Unfunded Actuarial Liability	$ 188,620,877	$ 179,034,122
4. Funded Ratio	55.9%	60.2%

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 Actuarial Cost Method**. Under this method, there are two components to the total contribution: the **normal cost rate** and the **unfunded actuarial liability rate** (UAL 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 is the maximum amortization period permitted under GASB Statement No. 25, but which 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%.

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, 2012	**June 30, 2013**
Statutory Funding Rates		
Members	9.00%	9.00%
Employers	14.41%	14.41%
State	29.37%	29.37%
Total	52.78%	52.78%
Normal Cost Rate	26.26%	26.29%
Funding Rate Available for Amortization	26.52%	26.49%
Unfunded Actuarial Liability (Surplus)	$ 193,232,265	$ 187,365,258
Years to Amortize*	25.7 years	23.8 years

* On a market value basis, the Years to Amortize the Unfunded Actuarial Liability were 24.7 years at June 30, 2012 and 22.2 years at June 30, 2013.

SECTION IV
CONTRIBUTIONS

Table IV-2 Calculated Contribution Basis		
	June 30, 2012	**June 30, 2013**
Normal Cost Rate	26.26%	26.29%
Amortization Payment (30-years)	24.20%	23.05%
Total Calculated Contribution Rate	50.46%	49.34%
Less Statutory Rate	52.78%	52.78%
Shortfall (Surplus) in Statutory Rate	(2.32%)	(3.44%)

Table IV-3 Calculated Contribution on Market Value (MCA 19-2-407)		
	June 30, 2012	**June 30, 2013**
Normal Cost Rate	26.26%	26.29%
Amortization Payment (30-years)	23.62%	22.03%
Total Calculated Contribution Rate	49.88%	48.32%
Less Statutory Rate	52.78%	52.78%
Shortfall (Surplus) in Statutory Rate	(2.90%)	(4.46%)

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

Table IV-4 Projected Calculated Contribution Rates	
Valuation Year	**Rate**
2014	47.95%
2015	47.28%
2016	46.25%
2017	45.51%
2018	44.74%

SECTION V
ACCOUNTING STATEMENT INFORMATION

Accounting Standard Codification Topic No. 960 of the Financial Accounting Standards Board specifies certain information for a plan to disclose regarding its funded status. Statement No. 25 of the Governmental Accounting Standards Board (GASB) establishes standards for disclosure of pension information by public employee retirement systems (PERS) and governmental employers in notes to financial statements and supplementary information.

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.

The GASB-25 actuarial liability is the same as the actuarial liability amount calculated for funding purposes.

Both the present value of accrued benefits (FASB ASC Topic No. 960) and the actuarial liability (GASB-25) 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 requires the actuarial liability be compared with the actuarial value of assets for funding purposes. The relevant amounts as of June 30, 2013 are exhibited in Table V-1.

Tables V-2 through V-5 are exhibits to be used with the System CAFR report. Table V-2 is the Note to Required Supplementary Information, Table V-3 is a history of gains and losses in Accrued Liability, Table V-4 is the Schedule of Funding Progress, and V-5 is the Solvency Test which shows the portion of Accrued Liability covered by Assets.

SECTION V
ACCOUNTING STATEMENT INFORMATION

Table V-1 Accounting Statement Information		
	June 30, 2012	**June 30, 2013**
A. FASB ASC Topic No. 960 Basis		
1. Present Value of Benefits Accrued and Vested to Date		
a. Members Currently Receiving Payments	$ 248,259,795	$ 267,540,016
b. Former Vested Members	6,814,987	7,939,399
c. Active Members	104,855,165	107,471,565
2. Total Present Value of Accrued Benefits (1 (a) + 1(b) + 1(c))	$ 359,929,947	$ 382,950,980
3. Assets at Market Value	238,636,453	271,009,167
4. Unfunded Present Value of Accrued Benefits (2 – 3)	$ 121,293,494	$ 111,941,813
5. Ratio of Assets to Present Value of Accrued Benefits (3 / 2)	66.3%	70.8%
B. GASB No. 25 Basis		
1. Actuarial Liabilities for retirees and beneficiaries currently receiving benefits and terminated employees not yet receiving benefits	$ 255,074,782	$ 275,479,415
2. Actuarial Liabilities for current employees	172,182,548	174,563,874
3. Total Actuarial Liability (1 + 2)	$ 427,257,330	$ 450,043,289
4. Net Actuarial Assets available for benefits	234,025,065	262,678,031
5. Unfunded Actuarial Liability (3 – 4)	$ 193,232,265	$ 187,365,258

SECTION V
ACCOUNTING 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, 2013
Actuarial cost method	Entry Age
Amortization method	Open
Remaining amortization period for Annual Required 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 and amortization of the unfunded actuarial liability. 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.

SECTION V
ACCOUNTING 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	2008	2009	2010	2011	2012	2013
Investment Income on Actuarial Assets	$ (1,427)	$ (17,616)	$(19,446)	$ (15,675)	$ (9,033)	$ 7,836
Combined Liability Experience	(2,999)	1,397	(4,558)	(45)	(2,944)	454
(Loss)/Gain During Year from Financial Experience	$ (4,426)	$ (16,219)	$(24,004)	$ (15,720)	$ (11,977)	$ 8,290
Non-Recurring Items	0	0	(10,526)	0	0	0
Composite Gain (or Loss) During Year	$ (4,426)	$ (16,219)	$(34,530)	$ (15,720)	$ (11,977)	$ 8,290

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
2013	$ 262,678	$ 450,043	58 %	$ 187,365	$ 42,796	438 %
2012	234,025	427,257	55 %	193,232	41,745	463 %
2011	221,669	401,381	55 %	179,712	39,470	455 %
2010	217,545	380,393	57 %	162,848	37,220	438 %
2009	214,344	345,261	62 %	130,917	34,687	377 %
2008	212,312	327,556	65 %	115,244	32,181	358 %

* Years prior to 2009 were taken from reports prepared by prior actuary.

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SECTION V
ACCOUNTING 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)
2013	$ 34,778	$ 267,540	$ 147,725	$ 262,678	100 %	85 %	0 %
2012	34,687	248,260	144,310	234,025	100 %	80 %	0 %
2011	32,906	239,176	129,298	221,669	100 %	79 %	0 %
2010	30,986	229,057	120,350	217,545	100 %	81 %	0 %
2009	28,693	212,169	104,399	214,344	100 %	88 %	0 %
2008	27,165	207,233	93,158	212,312	100 %	89 %	0 %

* Years prior to 2009 were taken from reports prepared by prior actuary.

APPENDIX A
MEMBERSHIP INFORMATION

| | | | | Terminated | Terminated | |
| | | | Retirees and | Vested | Non-Vested | |
Reconciliation of Participant Counts	Active	Disabled	Beneficiaries	Members	Members	Total
Participant counts used for valuation	734	88	624	52	77	1,575
Disabled members having attained normal retirement age		(68)	68			-
Beneficiaries of Disabled Members						-
Beneficiaries with less than one year of certain payments remaining			-			-
Other Adjustments			(2)			(2)
Participant counts shown in Annual Financial Report	734	20	690	52	77	1,573

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 7) 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.

The salaries used in the tables and charts which follow are different than the salaries used for the Board Summary on page 7. For this Appendix A, the valuation projected salaries 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 7. For this Appendix A, the valuation projected benefits to be paid for the following fiscal year (including GABA where applicable), whereas for the Board Summary, annual benefits are as of the valuation date.

APPENDIX A
MEMBERSHIP INFORMATION

Montana Municipal Police Officers' Retirement System Distribution of Active Members by Age and Service as of June 30, 2013

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	7	5	0	0	0	0	0	0	0	0	12
25 to 29	22	62	15	0	0	0	0	0	0	0	99
30 to 34	13	57	60	10	0	0	0	0	0	0	140
35 to 39	13	31	44	27	7	0	0	0	0	0	122
40 to 44	5	17	30	42	42	5	0	0	0	0	141
45 to 49	3	10	14	26	37	21	2	0	0	0	113
50 to 54	1	4	10	7	10	12	3	0	0	0	47
55 to 59	1	2	4	1	1	4	1	1	0	0	15
60 to 64	0	0	1	4	1	1	0	0	1	0	8
65 to 69	0	0	0	1	0	0	0	0	0	0	1
70 & up	0	0	0	0	0	0	0	0	0	0	0
Total	65	188	178	118	98	43	6	1	1	0	698

* Data for 36 DROP participants are excluded from the above table.

APPENDIX A
MEMBERSHIP INFORMATION

Montana Municipal Police Officers' Retirement System Distribution of Active Members by Age as of June 30, 2013

Age Distribution
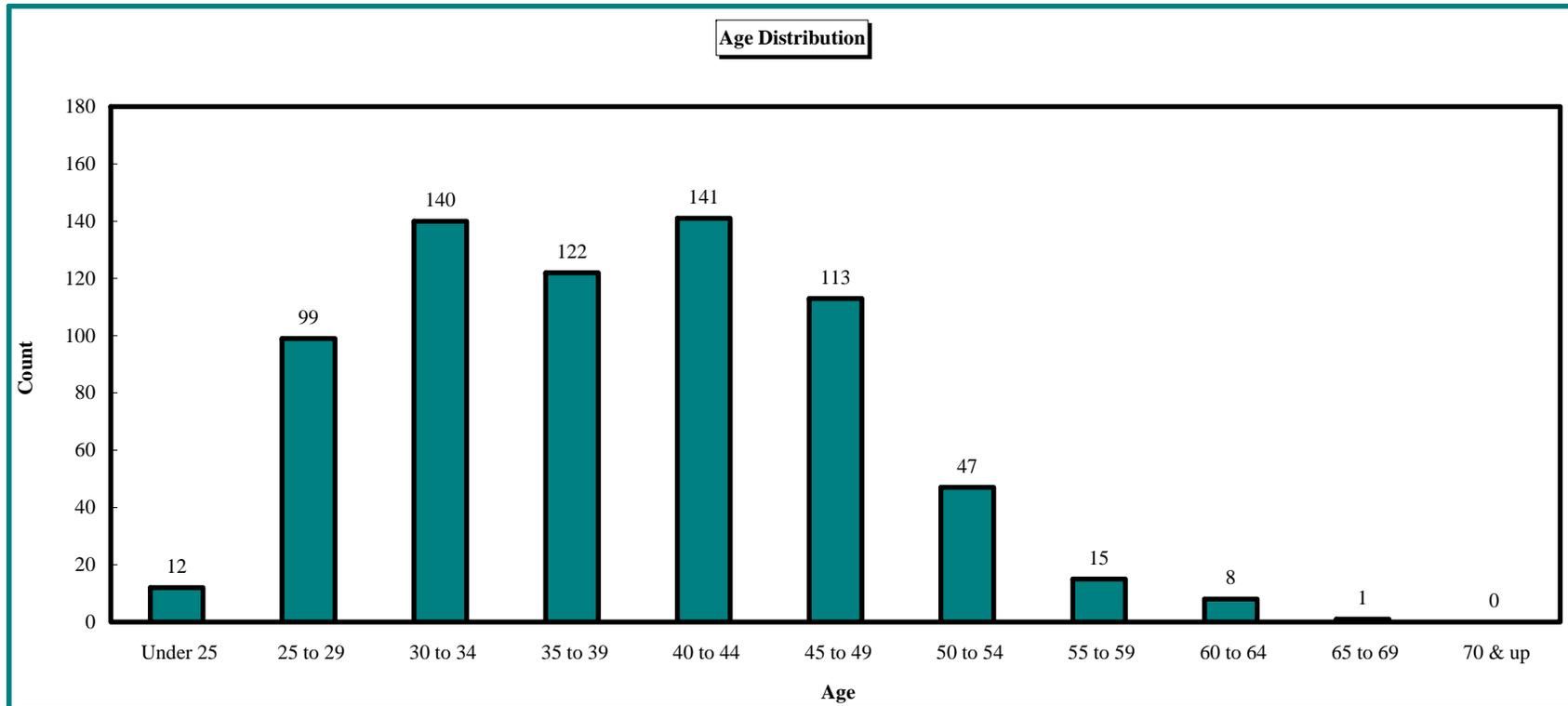
* Data for 36 DROP participants are excluded from the above table.

APPENDIX A
MEMBERSHIP INFORMATION

Montana Municipal Police Officers' Retirement System Distribution of Active Members by Service as of June 30, 2013

* Data for 36 DROP participants are excluded from the above table.

APPENDIX A
MEMBERSHIP INFORMATION

Montana Municipal Police Officers' Retirement System Distribution of Active Members by Age and Service as of June 30, 2013
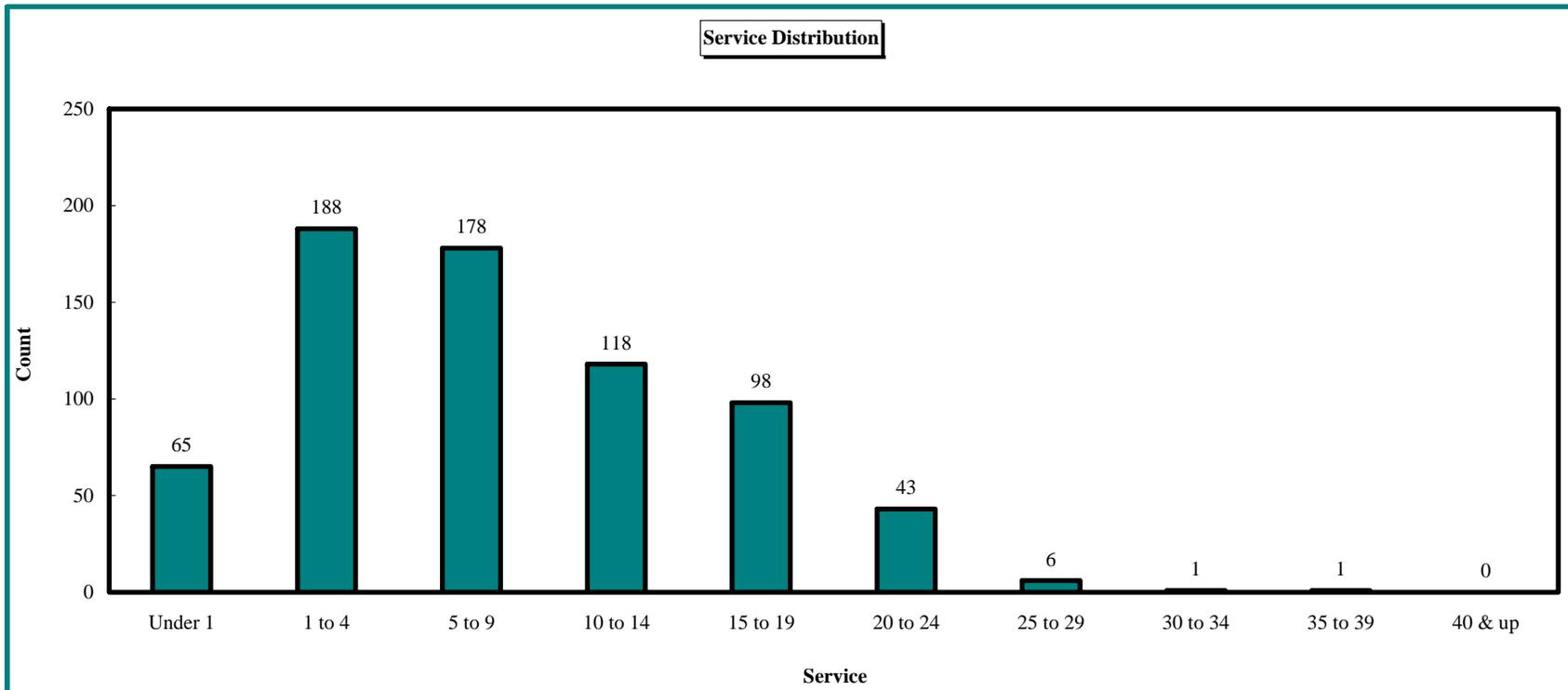
AVERAGE SALARY BY AGE/SERVICE

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	$52,616	$41,760	$0	$0	$0	$0	$0	$0	$0	$0	$48,093
25 to 29	$46,962	$51,339	$53,939	$0	$0	$0	$0	$0	$0	$0	$50,760
30 to 34	$51,664	$53,094	$55,894	$64,542	$0	$0	$0	$0	$0	$0	$54,979
35 to 39	$44,514	$49,674	$56,594	$60,366	$69,935	$0	$0	$0	$0	$0	$55,149
40 to 44	$51,581	$45,225	$56,435	$60,940	$72,780	$75,293	$0	$0	$0	$0	$61,791
45 to 49	$42,753	$46,648	$53,675	$62,710	$64,598	$75,009	$85,905	$0	$0	$0	$62,954
50 to 54	$60,557	$42,948	$44,255	$61,679	$71,142	$76,272	$78,492	$0	$0	$0	$63,166
55 to 59	$11,910	$85,777	$48,938	$66,947	$72,776	$74,733	$77,231	$78,144	$0	$0	$64,883
60 to 64	$0	$0	$75,471	$53,688	$48,033	$54,143	$0	$0	$99,780	$0	$61,522
65 to 69	$0	$0	$0	$91,120	$0	$0	$0	$0	$0	$0	$91,120
70 & up	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total	$47,853	$50,727	$55,119	$61,609	$69,068	$74,883	$80,753	$78,144	$99,780	$0	$57,850

* Data for 36 DROP participants are excluded from the above table.
  The salary shown in the above chart was used for valuation purposes and assumes pay increases for the year.

Montana Municipal Police Officers' Retirement System Distribution of Active Members by Age as of June 30, 2013

Average Salary Distribution

Age	Average Salary
Under 25	$48,093
25 to 29	$50,760
30 to 34	$54,979
35 to 39	$55,149
40 to 44	$61,791
45 to 49	$62,954
50 to 54	$63,166
55 to 59	$64,883
60 to 64	$61,522
65 to 69	$91,120
70 & up	$0

* Data for 36 DROP participants are excluded from the above table.

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Montana Municipal Police Officers' Retirement System Distribution of Active Members by Service as of June 30, 2013

Average Salary Distribution

* Data for 36 DROP participants are excluded from the above table.

APPENDIX A
MEMBERSHIP INFORMATION

Montana Municipal Police Officers' Retirement System Distribution of Retired Members, Survivors, and Disabled Members as of June 30, 2013

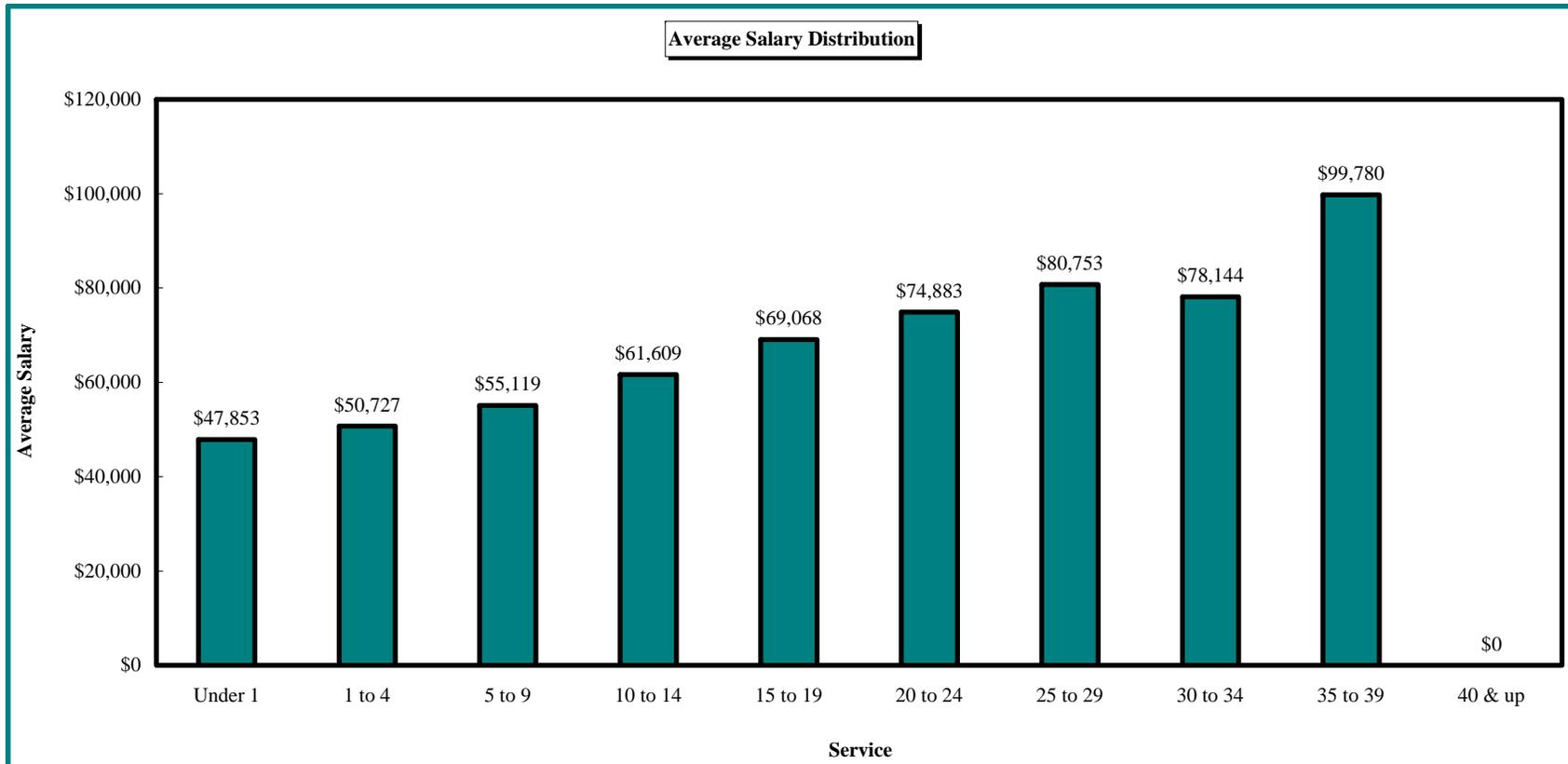| Age	Count	Annual Benefit	Age	Count	Annual Benefit
<25	3	$52,174	73	10	$236,251
25	0	$0	74	15	$363,302
26	0	$0	75	11	$255,659
27	0	$0	76	14	$361,619
28	0	$0	77	15	$345,122
29	0	$0	78	12	$268,416
30	0	$0	79	12	$300,451
31	0	$0	80	14	$334,611
32	0	$0	81	11	$286,482
33	1	$20,636	82	11	$275,640
34	0	$0	83	12	$268,545
35	0	$0	84	10	$236,419
36	1	$23,757	85	7	$172,994
37	0	$0	86	2	$47,236
38	0	$0	87	7	$164,992
39	0	$0	88	6	$146,227
40	1	$28,692	89	9	$206,929
41	2	$63,482	90	2	$40,964
42	5	$130,068	91	4	$86,338
43	1	$24,469	92	1	$22,141
44	6	$160,530	93	0	$0
45	7	$232,250	94	1	$35,016
46	7	$213,003	95	1	$22,141
47	6	$162,570	96	1	$24,173
48	11	$328,152	97	0	$0
49	5	$143,591	98	0	$0
50	13	$334,140	99	2	$45,016
51	17	$423,121	100	0	$0
52	20	$483,280	101	0	$0
53	15	$434,360	102	0	$0
54	15	$416,888	103	0	$0
55	13	$338,053	104	0	$0
56	18	$483,575	105	0	$0
57	25	$632,792	106	0	$0
58	20	$555,954	107	0	$0
59	19	$527,923	108	0	$0
60	23	$750,701	109	0	$0
61	27	$761,120	110	0	$0
62	25	$685,095	111	0	$0
63	29	$870,610	112	0	$0
64	37	$1,151,582	113	0	$0
65	27	$893,421	114	0	$0
66	31	$940,510	115	0	$0
67	18	$484,185	116	0	$0
68	19	$557,939	117	0	$0
69	20	$635,550	118	0	$0
70	13	$290,738	119	0	$0
71	12	$315,496	120	0	$0
72	10	$261,161			
			Totals	712	$19,358,253

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.

APPENDIX A
MEMBERSHIP INFORMATION

Montana Municipal Police Officers' Retirement System Distribution of Retired Members, Survivors, and Disabled Members as of June 30, 2013
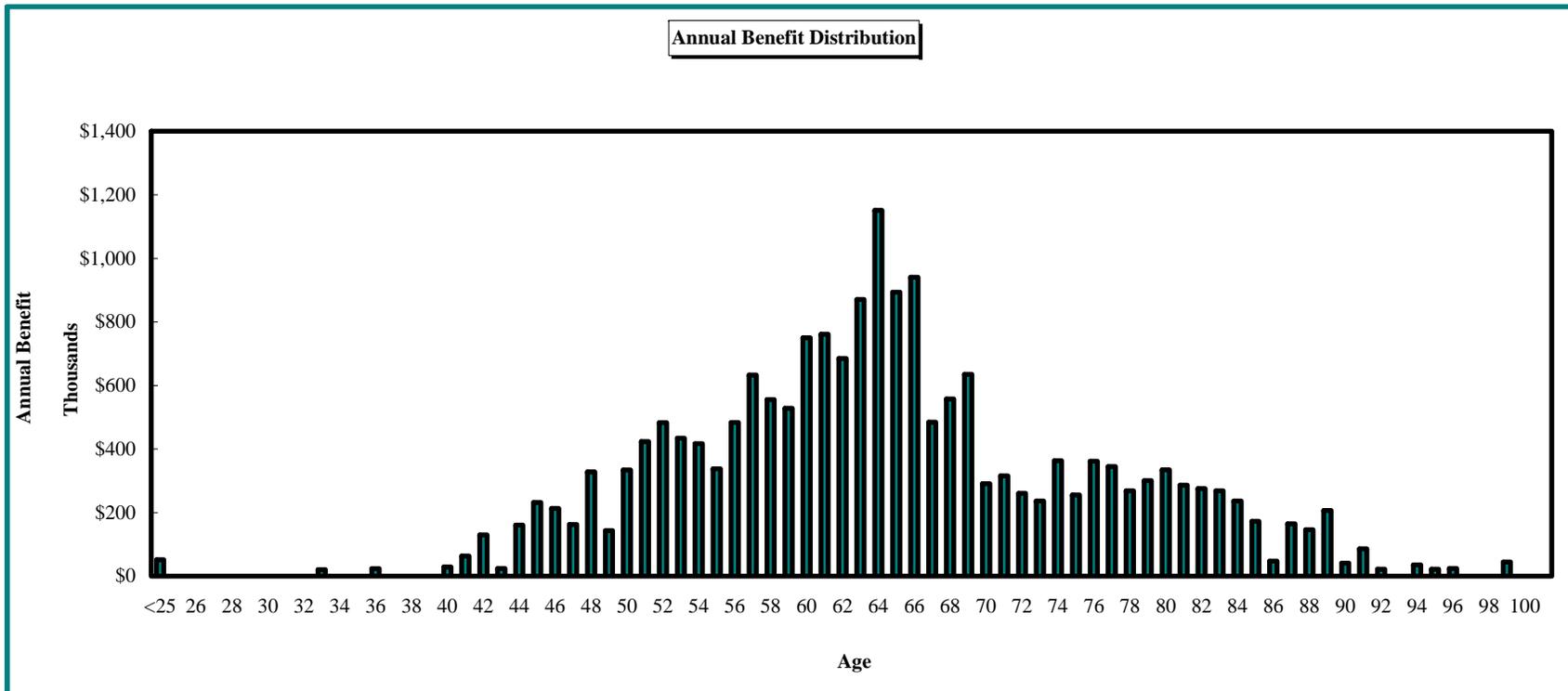
APPENDIX A
MEMBERSHIP INFORMATION

Montana Municipal Police Officers' Retirement System Distribution of Terminated Vested Members as of June 30, 2013

| 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	$7,140	$0	79	0	$0	$0
31	1	$7,868	$0	80	0	$0	$0
32	1	$11,878	$0	81	0	$0	$0
33	1	$7,923	$0	82	0	$0	$0
34	1	$5,826	$0	83	0	$0	$0
35	3	$23,611	$0	84	0	$0	$0
36	1	$8,159	$0	85	0	$0	$0
37	3	$33,987	$0	86	0	$0	$0
38	1	$8,334	$0	87	0	$0	$0
39	3	$24,958	$0	88	0	$0	$0
40	2	$16,690	$0	89	0	$0	$0
41	2	$14,052	$0	90	0	$0	$0
42	6	$82,196	$0	91	0	$0	$0
43	1	$16,805	$0	92	0	$0	$0
44	3	$40,003	$0	93	0	$0	$0
45	6	$62,972	$21,477	94	0	$0	$0
46	6	$87,655	$0	95	0	$0	$0
47	0	$0	$0	96	0	$0	$0
48	4	$57,970	$0	97	0	$0	$0
49	4	$46,669	$0	98	0	$0	$0
50	0	$0	$0	99	0	$0	$0
51	0	$0	$0	100	0	$0	$0
52	0	$0	$0	101	0	$0	$0
53	2	$16,840	$0	102	0	$0	$0
54	0	$0	$0	103	0	$0	$0
55	0	$0	$0	104	0	$0	$0
56	0	$0	$0	105	0	$0	$0
57	0	$0	$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	52	$581,535	$21,477

payable at the greater of age 50 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 Municipal Police Officers' Retirement System Distribution of Terminated Vested Members as of June 30, 2013
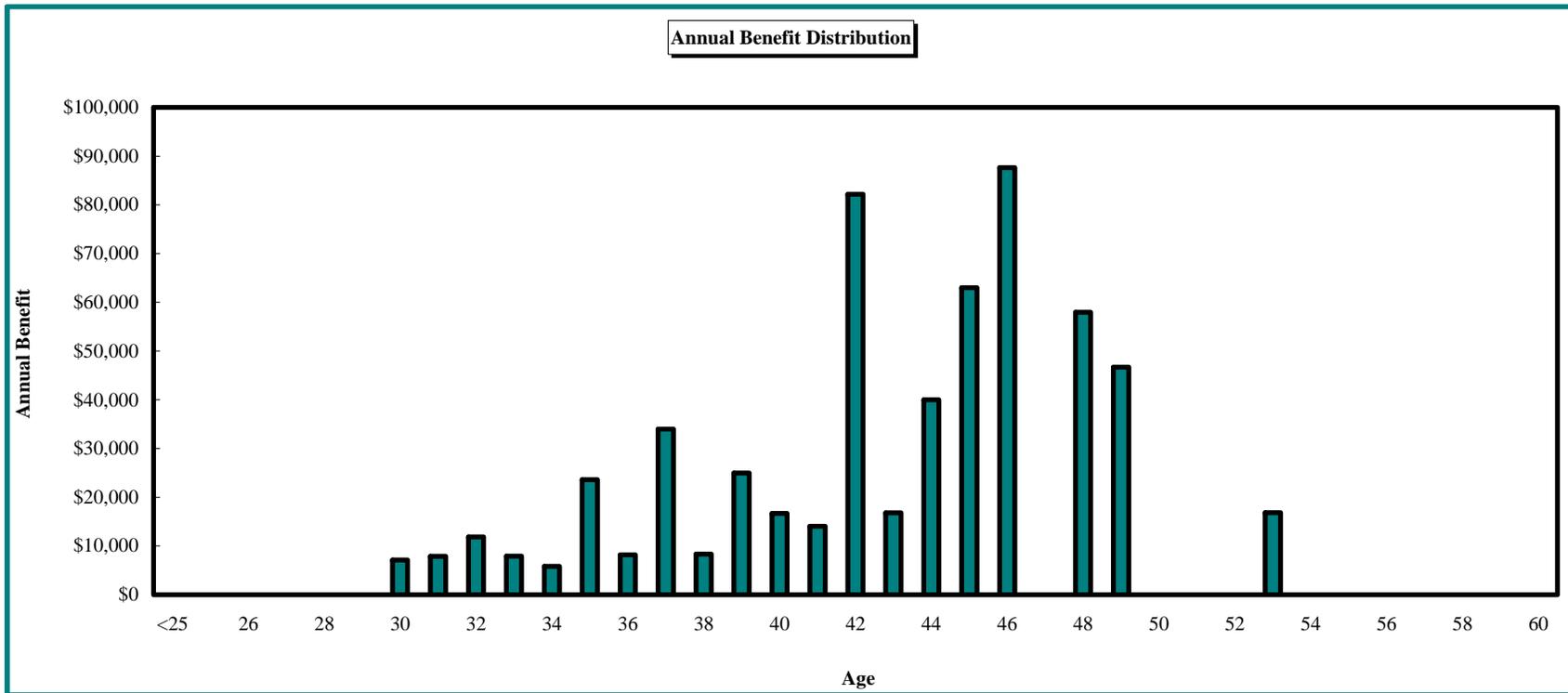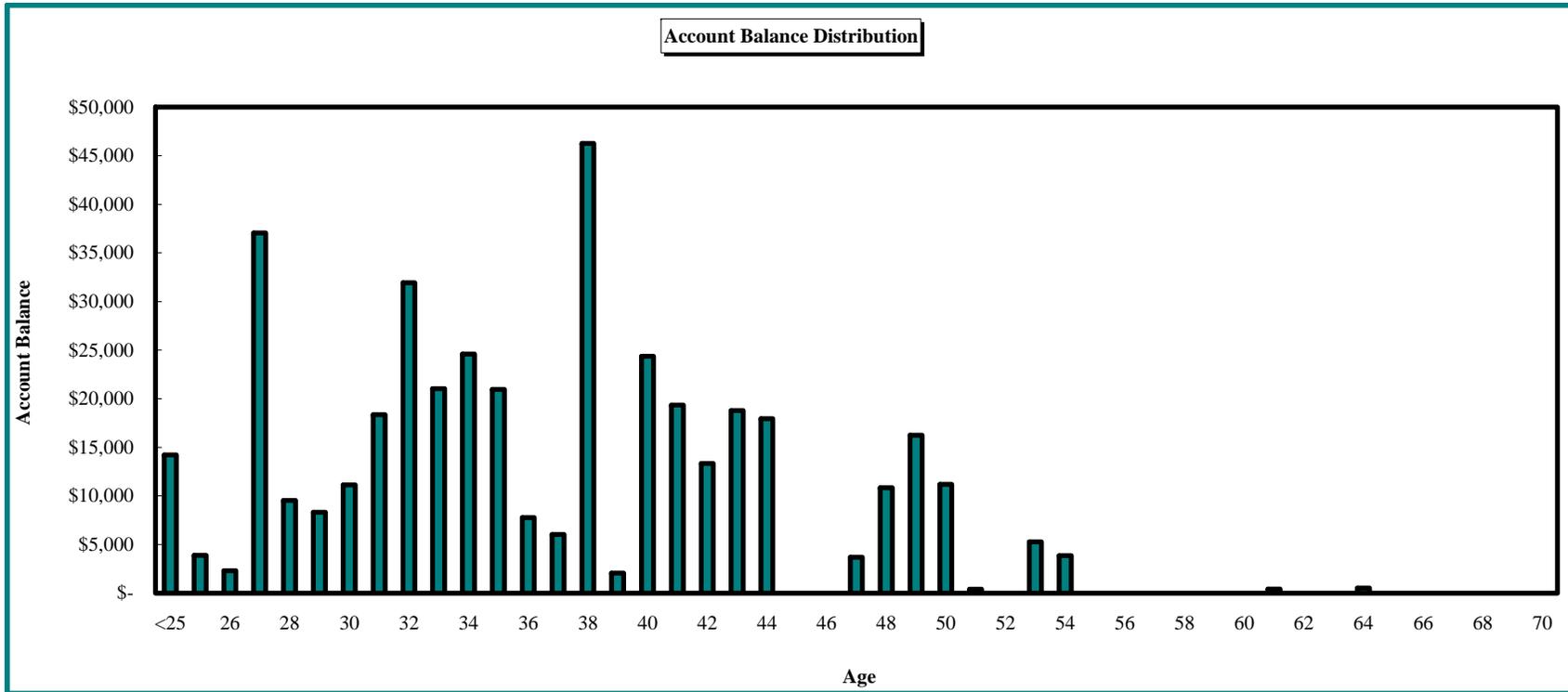
APPENDIX A
MEMBERSHIP INFORMATION

Montana Municipal Police Officers' Retirement System Distribution of Terminated Non-Vested Members as of June 30, 2013

Age	Count	Account Balance	Age	Count	Account Balance
<25	5	$14,229	73	0	$0
25	2	$3,878	74	0	$0
26	1	$2,305	75	0	$0
27	5	$37,058	76	0	$0
28	1	$9,542	77	0	$0
29	1	$8,317	78	0	$0
30	3	$11,138	79	0	$0
31	5	$18,354	80	0	$0
32	3	$31,934	81	0	$0
33	3	$21,040	82	0	$0
34	4	$24,606	83	0	$0
35	3	$20,975	84	0	$0
36	5	$7,772	85	0	$0
37	4	$6,038	86	0	$0
38	3	$46,254	87	0	$0
39	1	$2,059	88	0	$0
40	6	$24,361	89	0	$0
41	2	$19,358	90	0	$0
42	1	$13,338	91	0	$0
43	2	$18,776	92	0	$0
44	2	$17,939	93	0	$0
45	0	$0	94	0	$0
46	0	$0	95	0	$0
47	1	$3,687	96	0	$0
48	2	$10,848	97	0	$0
49	3	$16,245	98	0	$0
50	1	$11,198	99	0	$0
51	1	$401	100	0	$0
52	0	$0	101	0	$0
53	1	$5,264	102	0	$0
54	3	$3,868	103	0	$0
55	1	$10	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	1	$417	110	0	$0
62	0	$0	111	0	$0
63	0	$0	112	0	$0
64	1	$536	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	77	$411,746

APPENDIX A
MEMBERSHIP INFORMATION

Montana Municipal Police Officers' Retirement System Distribution of Terminated Non-Vested Members as of June 30, 2013

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%

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%

APPENDIX B
ACTUARIAL ASSUMPTIONS AND METHODS

c. **Rates of Active Disability**

Sample Rates of Active Disability	
Age	Rate
22	0.00%
27	0.25%
32	0.25%
37	0.25%
42	0.50%
47	0.50%
52	0.50%
57	0.50%
62	0.00%

All disabilities are assumed to be permanent and without recovery.

d. **Termination of Employment (Prior to the 20 years of service requirement for Normal Retirement Eligibility)**

Service	Rate
0	15%
1	10%
2	10%
3	10%
4	10%
5-9	5%
10-14	2%
15 & over	1%

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

Probability of Electing Refund		
Age at Term.	Non-Vested	Vested
Under 35	100%	60%
35-39	100%	10%
40-44	100%	10%
45-49	100%	10%
50 & Over	100%	0%

APPENDIX B
ACTUARIAL ASSUMPTIONS AND METHODS

f. Retirement

	Annual Retirement Rates	
Age	Less than 20 years	20 years or more
<50	0.00%	12.00%
50 – 54	0.00%	15.00%
55 – 61	0.00%	20.00%
62 – 64	0.00%	100.00%
65 & Over	100.00%	100.00%

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

g. DROP Retirement

DROP accounts are assumed to earn the actuarial rate of return. 15% of active members are assumed to elect to enter the DROP for each of the first six years following DROP eligibility. These members are assumed to elect to participate in the DROP for five years. Members who have elected to participate in the DROP as of the valuation date are assumed to remain in the DROP until the end of the DROP period elected, unless they die or become disabled while in the DROP. Participants who have returned to work after DROP are assumed to retire immediately.

h. 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%

APPENDIX B
ACTUARIAL ASSUMPTIONS AND METHODS

i. 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.

j. 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 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. Interest on DROP accounts:	7.75%
e. Rate of Increase in Total Payroll (for Amortization):	4.00%

3. Changes since Last Valuation

None.

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 multiple-employer cost sharing plan that covers police officers of cities within the state, other than those cities which maintain a separate local police fund.

2. Contributions

Members' contributions depend upon date of hire and whether the member has elected to be covered by GABA. For members who have not elected GABA the rates of contribution are as follows:

(a) Hired after June 30, 1975 but on or before June 30, 1979: 7.0%
(b) Hired after June 30, 1979 but before July 1, 1997: 8.5%
(c) Hire on or after July 1, 1997, 9%

For all members who have elected GABA, the rate is 9.0% of compensation.

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.

Employers contribute 14.41% of each member's compensation.

The State contributes 29.37% of each member's compensation.

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 works 160 hours. This includes certain purchased service.

4. Membership Service

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

5. Final Average Compensation

Final Average Compensation is the average over the last 36 months (or shorter period of total service) of compensation paid to the member. Compensation is specifically defined in law for MPORS.

APPENDIX C
SUMMARY OF PLAN PROVISIONS

6. Service Retirement

Eligibility: (i) age 50 with five years of membership service; or (ii) any age with 20 years of membership service.

Benefit: 2.5% of final average compensation multiplied by years of service credit.

7. Disability Benefit

Eligibility: Immediately upon employment

Benefit: (i) Before completing 20 years of membership service, 50% of final average compensation.

(ii) After completing 20 years or more of membership service, 2.5% of final average compensation for each year of service credit.

8. Survivor's Benefit

Eligibility: Any active member

Benefit: (i) Before completing 20 years of membership service, 50% of member's final average compensation.

(ii) After completing 20 years of membership service, 2.5% of member's final average compensation for each year of service credit.

Benefits are paid to the surviving spouse (or equally to dependent children if there is no surviving spouse or after a surviving spouse dies, for as long as they remain dependent children). In the absence of a spouse or child, the accumulated contributions minus any benefits already paid will be paid to the member's designated beneficiary.

9. Vesting

Eligibility: Five years of membership service.

Benefit: Accrued normal retirement benefit, payable at age 50. 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.

APPENDIX C
SUMMARY OF PLAN PROVISIONS

10. 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 benefit is forfeited.

11. Form of Payment

The normal form of payment is a life annuity, with 100% continuation after death to a 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.

12. Post Retirement Benefit Increases

For retired members who became active members on and after July 1, 1997, and those who elected to be covered under the Guaranteed Annual Benefit Adjustment (GABA) and who have been retired at least 12 months, a GABA will be made 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 provided is equal to 50% of the current base compensation of a newly confirmed police officer of the employer that last employed the member as a police officer.

13. Changes since Last Valuation

Final Average Compensation (FAC) CAP - House Bill 97, effective July 1, 2013:
- For members hired on or after July 1, 2013, establishes a 110% annual cap on compensation considered as part of a member's highest or final average compensation with the 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 highest or final average compensation.
- Bonuses paid on or after July 1, 2013 to any member will not be treated as compensation for retirement purposes. Employer and employee contributions will no longer be paid on bonuses.

APPENDIX C
SUMMARY OF PLAN PROVISIONS

14. MPORS Deferred Retirement Option Plan (DROP)

Eligibility:	20 years of membership service.
Period:	Maximum of five years. Member may not receive service credit during DROP period.
Contributions:	State, employer and member contributions continue during the DROP period and are to be made to the retirement system.
Disability:	If a member becomes disabled during the DROP period, the member will not be eligible for MPORS disability benefits. If the member must terminate their service, their service retirement benefit will be paid to them rather than to their monthly DROP account. The member will also be eligible to receive their DROP account.

Survivor Benefit: If a member dies before the end of their DROP period, the surviving spouse or dependent children are entitled to the receive a lump-sum payment equal to the member's DROP benefit and the member's accumulated contributions minus any benefits paid from the member's DROP account, including monthly DROP accruals.

If the member does not have a surviving spouse or dependent children, then the member's designated beneficiary is entitled to receive a lump-sum payment equal to the member's DROP benefit.

The benefit paid must include interest credited to the participant account as follows:
a) through June 30, 2009, interest must be credited every fiscal year end at a rate reflecting the retirement system's annual investment earnings for the applicable fiscal year.
b) After June 30, 2009, interest must be credited every fiscal year end at the actuarially assumed rate of return. Proportionate interest must be credited for distributions taking place at other than a fiscal year end.

Benefit:	Member receives DROP accruals equal to the retirement benefit calculated at DROP commencement made, added each month during the DROP period plus interest. Effective July 1, 2009, the interest credited to the DROP accounts was changed to the actuarial assumed rate of 8%. As a result of the experience study performed during fiscal year 2010, the interest rate credited to DROP accounts was changed to the actuarial assumed rate of 7.75%.

15. Changes in DROP 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:

Amount		Probability of Payment	1/(1+Investment Return)		
$100	x	(1 - .01)	1/(1+.1)	=	$90

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.