



DES MOINES WATER WORKS  
Board of Water Works Trustees

Agenda Item No.     PEN-III      
Meeting Date: July 25, 2017  
Chairperson's Signature  Yes  No

**AGENDA ITEM FORM**

**SUBJECT: Pension Plan Actuarial Valuation**

**SUMMARY:**

Although the DMWW Pension Plan was frozen at December 31, 2013, contributions to the plan will continue for some time. One of the main principles of pension funding is that the cost of retirement benefits for a current employee should be paid during the years of service of that employee. Although frozen, benefits will continue to be funded over the remaining working years of employees.

DMWW uses the services of the Principal Financial Group to prepare an annual actuarial valuation of the pension plan. Included in the valuation is the calculation of an "actuarially determined contribution (ADC)" for the pension plan. The ADC for 2017 is \$1,029,589.

**FISCAL IMPACT:**

The Actuarially Determined Contribution (ADC) is included in the DMWW budget annually.

**RECOMMENDED ACTION:**

Receive and file Pension Plan Actuarial Valuation

**BOARD REQUIRED ACTION:**

Motion to receive and file Pension Plan Actuarial Valuation

_____/_____ Peggy Freese (date) Chief Financial Officer	_____/_____ (date)	_____/_____ William G. Stowe (date) CEO and General Manager
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Attachment: Actuarial Valuation Report

ACTUARIAL VALUATION REPORT

# Des Moines Water Works Pension Plan

4-49122

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Plan year beginning 01/01/2017 and ending 12/31/2017



# Table of Contents

(Click on topic below to link to that information)

<b>Summary of Results</b> .....	<b>3</b>
Current Year Plan Costs.....	3
Factors Impacting Current Year Costs.....	3
<b>Understanding Your Plan’s Funded Status</b> .....	<b>4</b>
<b>Contribution Schedule</b> .....	<b>9</b>
<b>Funding Calculations</b> .....	<b>10</b>
Actuarially Determined Contribution.....	10
Development of Total Normal Cost.....	11
Actuarial Accrued Liability .....	11
Unfunded Actuarial Accrued Liability.....	12
Schedule of Amortization Bases.....	13
<b>Data and Assumptions</b> .....	<b>14</b>
Plan Assets .....	14
Census Characteristics.....	16
Benefit Cash Flows .....	17
Plan Provisions .....	19
Assumptions and Methods.....	23
Actuary Statement .....	28
<b>Present Value of Accrued Plan Benefits</b> .....	<b>29</b>
<b>Risk-Free Results</b> .....	<b>30</b>
<b>Historical Results</b> .....	<b>31</b>

The subject matter in this communication is provided with the understanding that The Principal® is not rendering investment, legal, accounting, or tax advice. You should consult with appropriate counsel or other advisors on all matters pertaining to investment, legal, tax, or accounting obligations and requirements.

This report is for the defined benefit retirement plan named on the report cover and may only be provided to other parties in its entirety. Employee data and other information you provide, along with benefits described in your plan document are used for the basis of this report. This report includes your Actuarial Determined Contribution. Amounts in this report are not meant for your financial statements or to terminate your plan. Upon request, we will prepare other reports for these purposes.

# Summary of Results

## Current Year Plan Costs

The following is a synopsis of your plan costs for the current year, including the Actuarially Determined Contribution (ADC). For a complete schedule of the cash due and received by the plan, see the [Contribution Schedule](#).

**The Actuarially  
Determined Contribution  
for this plan year is  
\$1,029,589**

- We have not received any contributions yet for the current plan year.
- See [Funding Calculations](#) for details.
- Contributing less than this amount will increase your next year Actuarially Determined Contribution.

## Factors Impacting Current Year Costs

While completing this valuation, we reviewed the actuarial assumptions. This year the interest assumption was decreased from 6.50% to 6.25% and the mortality assumption was updated to reflect three additional years of Social Security Administration (SSA) data on U.S. population mortality (2012 - 2014). The assumption changes we made are disclosed in the [Assumptions and Methods](#) section of this report.

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Your Actuarially Determined Contribution increased from \$796,578 in 2016 to \$1,029,589 for 2017. This is primarily due to the decrease in interest assumption.

You can compare your contributions to the Actuarially Determined Contributions for the prior year in the Historical Results section at the back of this report.

Your Pension Actuarial Analyst is Connie R Huntrod  
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# Understanding Your Plan's Funded Status

While it is important to know the actuarially determined contribution level, it is also important to understand your plan's funded status. The funded status determines contribution levels and can help you make informed decisions about plan funding, investment policies and benefit changes.

## Measures of Plan Funded Status

The table below compares the plan's 01/01/2017 market value of assets (the solid line) to 01/01/2017 plan liabilities measured using the assumptions we have made about future events.

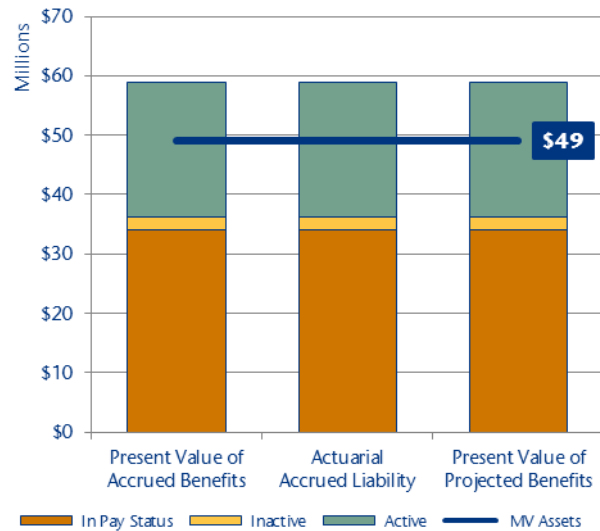
The liabilities assume:

- No one will enter the plan after the valuation date.
- Your asset allocation will remain the same with a return of 6.25% each year into the future.
- Plan participants will retire, die, terminate, and become disabled based on our assumptions.

### Three liability measures are shown:

1. **Present Value of Accrued Benefits** - benefits already earned through the valuation date.
2. **Actuarial Accrued Liability (AAL)** - represents the targeted asset level under your plan's cost method.
3. **Present Value of Projected Benefits** - all benefits expected to be earned through assumed retirement date.

Compare your plan's assets to each of the three liability measures to determine the funded status.  
*Since your plan is frozen, all liabilities are equal.*



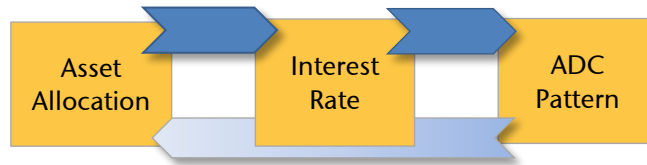
### Considerations

These funded status measurements should be evaluated when making decisions about your plan. The goal of the plan's cost method is to accumulate assets equal to the AAL. As long as your AAL is fully funded, you will only need to contribute the plan's Normal Cost each year. Otherwise, you'll also need to contribute amortization payments toward funding this liability.

Understanding how your assets compare to your Present Value of Accrued Benefits is important. At a minimum you want to have enough assets in the plan to cover the present value of the benefits accrued to date.

Funding in excess of the Present Value of Projected Benefits may not be the best use of your organization's funds. However, having excess assets may provide funding and plan design flexibility.

## Asset Allocation, Interest Rates and Actuarially Determined Contributions (ADC)



Three key factors are linked in the determination of the pattern and level of the ADC for your plan: your asset allocation, the assumed funding interest rate and the pattern of your ADC. This section discusses how these three factors are related, illustrates the impact of interest rates on measures of benefit liability, and provides information to consider as you review your funding and asset allocation decisions.

The liability measures shown on the previous page and used to calculate your Actuarially Determined Contribution (ADC) reflect assumptions about future investment returns based on your asset allocation. However, future investment returns are not guaranteed, and will fluctuate. To make informed decisions about funding policy, benefit design, and asset allocations, you need to understand the effect of the [liability interest rate assumption](#).

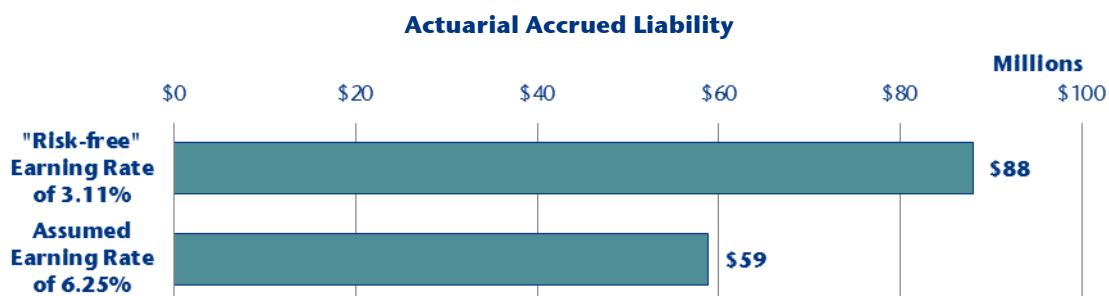
The only sources of funding for your benefits are your cash contributions and asset earnings. The present value of benefits (liability measure) is less than the benefits payable because it is reduced for assumed future asset earnings. When asset earnings fall below expectations, additional cash will be needed to allow payment of all your benefits. Your cost method is used to budget the expected total cost of your plan, and determines the ADC for each plan year.

### Asset Allocations and Interest Rates

To help understand how the level of ADC can change over time, a best practice is to evaluate the benefit liability ignoring the plan's asset allocation. A recommended approach is to use a conservative "risk-free" interest rate such as U.S. Treasury instruments.

	Diversified Asset Allocation	"Risk free" Return
<b>Expected future returns</b>	<a href="#">interest</a> rate based on your plan's asset allocation	conservative interest rates such as U.S. Treasury instruments (not based on your plan's investment allocation)
<b>Means</b>	<b>Lower ADC today</b> and potentially <b>higher ADC later</b> if returns fall below that assumed	<b>Higher ADC today</b> and potentially <b>lower ADC later</b> if greater returns are earned

The chart below shows your plan’s Actuarial Accrued Liability used in the ADC calculation compared to the liability determined using a “risk-free” interest rate. This chart indicates how much impact asset earnings can have on the cash required to fund benefits over the life of the plan.



As you can see above, higher expected returns generate a lower benefit liability. The additional assumed returns between Funding Basis (6.25%) and Risk-Free Basis (3.11%) are referred to as “risk premium”. The \$29,073,472 difference in the two liability amounts is the assumed risk premium to be earned over the life of the plan.

The [Risk-Free Results](#) section later in this report shows additional liability comparisons.

### Asset Allocation and ADC

The interest return assumption we use to measure benefit liabilities for funding is **based on your asset allocation**. As a result, your asset allocation choices impact your ADC:

- More volatile asset classes may reduce the current ADC for your plan, but will cause both future ADC and funded status to fluctuate more. There is the potential for severe declines in funded status and increases in ADC when markets perform poorly.
- More conservative asset classes may result in a higher ADC, but provide a more stable basis for planning and budgeting.

The more volatile the value of your asset classes, the greater the range of the potential ADC. You can evaluate the potential impact of alternative asset allocations - and how you could balance your long-term cost and the volatility of your annual ADC - through forecasting studies.

### Benefit Changes and Risk-Free Interest Rates

A decision to change plan benefits can have long-term funding implications. Plan sponsors should be cautious about spending what appears to be excess assets in a given plan year on benefit increases. Working with your actuary to request a plan design study can help with your decision.

Recognizing the volatility of the ADC (discussed in the paragraph above), you will want to include the value of the proposed benefit change on a more conservative rate (ex. a risk-free rate) and/or a forecast of long-term funding levels. Discussing the study with your plan actuary can help you decide what, if any, benefit changes you can afford over the long term.

## Forecasting: A Best Practice

Industry experts agree that it is a prudent best practice to review the long-term trends of your plan. We provide historical information at the back of this report. But that is like driving using just your rear view mirror: you only see part of the picture.

### Short-Term

Neither this year's ADC nor funded status is a good estimate of future amounts because they are volatile from year to year. These measures depend on your plan's assets and benefit liability:

- **Plan Asset Values** increase or decrease with market returns on investments, contributions made, benefit payments and expenses. Using an asset smoothing method also affects the upcoming year asset values.
- **Benefit Liability** is impacted by benefit payments, census or demographic changes, and assumption changes.

If you need to budget for next year or explore the potential volatility of results over the next few years, consider requesting a short-term forecast.

### Long-Term

A 10- or 20-year forecast of your plan's ADC and funded status under both expected and adverse economic scenarios is an excellent planning tool and can be a good investment.

- Comparing the results from your current asset allocation to alternative investment options can provide valuable insights to guide **asset allocations**. Comparing different funding policies can help evaluate whether your policy will meet your goals and fit in your budget.
- Stress-testing based on **economic conditions** can help you assess plan risk, and to set funding and investment policies.
- Projecting census or demographic changes, and the benefits offered can help identify **long-term trends**.

If you want to explore the potential volatility of results over an extended time period, consider requesting a long-term forecast.

## Keep Us Informed

Please make us aware of any upcoming plan design or significant participant group changes (such as layoffs, increases in staff, or large retirements). Knowing about possible changes gives us the chance to advise you whether further analysis of the cost impact should be considered.



## Options for Your Frozen Plan

Even though your plan is frozen, **you can choose to maintain the plan or plan for a future termination date.** Either way, you must continue to fund the benefits already earned and the expenses paid from your plan assets.

**If your intent is to terminate,** you will be required to provide all benefits in full, and that cost almost always exceeds the ongoing cost of the plan. Even having a 100% funded status in this report doesn't translate to being sufficient to terminate the plan right now. Plan termination liability changes with market conditions, and is ultimately set at the time of the final asset distribution.

In most situations, the liabilities settled at plan termination are more costly than either your plan's funding or accounting liabilities. Termination uses interest rates that are available in the market at the date of termination for liabilities and the market value of assets. The relationship between these measures and your funding or accounting funded status can vary over time. Plan provisions, averaging of interest rates or market returns, and providing benefits during the plan's life that are not provided at termination all can affect the comparison to plan termination liability. Non-retired participants' choices at termination - an annuity instead of a lump sum - can increase the cost of a plan termination. To help your planning, we can provide a termination liability estimate for your specific situation based on current market conditions.

Knowing the potential shortfall can help you develop a contribution timeline that fits your situation. The simplest first step may be to increase your annual contribution. We can also help you develop a more detailed funding plan – keying to either your timeline or your annual contribution budget.

As you move along your path to termination, we can assist you with developing a timeline with a funding strategy and by providing monitoring tools to track your progress.

# Contribution Schedule

The table below shows the contributions received and payments that are due to meet the Actuarially Determined Contribution (ADC) for this year. You can fund more than this schedule.

- The total cash contributions made for the 2016 plan year is \$796,578.
- No cash contributions have been received yet for the current plan year.

Paid or	For Plan Year Beginning in		
Date Due	2016	2017	2018
04/04/2016	\$199,144.50		
07/01/2016	\$199,144.50		
10/10/2016	\$199,144.50		
01/04/2017	\$199,144.50		
12/31/2017		\$1,029,589	
12/31/2018			To be determined

**Contributions:**

<span style="display: inline-block; width: 15px; height: 15px; background-color: #FFF9C4; border: 1px solid black;"></span>	Received	<span style="display: inline-block; width: 15px; height: 15px; background-color: #FFD700; border: 1px solid black;"></span>	Due for Current Year	<span style="display: inline-block; width: 15px; height: 15px; background-color: #FFF9C4; border: 1px solid black;"></span>	Due for Next Year
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# Funding Calculations

## Actuarially Determined Contribution

The actuarially determined contribution (ADC) includes two primary components. First, the Normal Cost is the cost attributed to the current year, due to the continued accrual of plan benefits for active employees, and plan expenses.

The second main component is an amortization of any unfunded accumulated past costs (Unfunded Actuarial Accrued Liability).

The sum of these two components is then increased for interest to the end of the plan year.

Total Normal Cost	\$25,000
Plus Amortization Amounts	944,025
Plus valuation interest to the end of the plan year	60,564
<b>Actuarially Determined Contribution (ADC)</b>	<b>\$1,029,589</b>

## Development of Total Normal Cost

Normal cost is the portion of cost assigned to each year based on the [cost method](#) and [assumptions](#) shown in this report.

Normal cost	\$0
Plus estimated expenses	25,000
<b>Total Normal Cost</b>	<b>\$25,000</b>

## Actuarial Accrued Liability

The Actuarial Accrued Liability (AAL) is the targeted asset level for the plan and is used in the calculation of the Unfunded Actuarial Accrued Liability on the following page. The AAL below is the amount after any assumption or plan changes.

Active participants	\$22,580,548
Inactive participants	2,142,872
Participants and beneficiaries in pay status	34,146,756
<b>Actuarial Accrued Liability</b>	<b>\$58,870,176</b>

## Unfunded Actuarial Accrued Liability

Each year the Unfunded Actuarial Accrued Liability (UAAL) is calculated and equals the Actuarial Accrued Liability less the Actuarial Value of Assets. An experience gain or loss occurs when actual plan experience differs from what was assumed. The gain or loss is calculated separately and amortized as a charge (for a loss) or a credit (for a gain). The UAAL is then adjusted for amendments, assumption changes, or method changes and a liability base is created.

<b>Expected Unfunded Actuarial Accrued Liability</b>		
01/01/2016 Unfunded Actuarial Accrued Liability (UAAL)	\$6,440,080	
01/01/2016 Employer Normal Cost	25,000	
Interest on the above items	420,230	
<b>Total Expected UAAL without Contributions</b>		<b>\$6,885,310</b>
Employer contributions	\$796,578	
Interest on employer contributions	18,812	
<b>Total Contributions with interest</b>		<b>\$815,390</b>
<b>Expected 01/01/2017 Unfunded Actuarial Accrued Liability</b>		<b>\$6,069,920</b>
(Total Expected UAAL less Contributions with interest)		
<b>Actual Unfunded Actuarial Accrued Liability (before any changes)</b>		
Actuarial Accrued Liability	\$57,892,044	
Less Actuarial Value of Assets	51,013,888	
<b>Preliminary 01/01/2017 Unfunded Actuarial Accrued Liability</b>		<b>\$6,878,156</b>
<b>Experience (Gain) or Loss</b>		
Actual Unfunded Actuarial Accrued Liability	\$6,878,156	
Less Expected Unfunded Actuarial Accrued Liability	6,069,920	
<b>(Gain)Loss</b>		<b>\$808,236</b>
2016 Actuarially Determined Contribution	\$796,578	
Less Total Contributions with interest	815,390	
<b>Additional (Gain)/Loss from (excess) shortage of contributions</b>		<b>\$(18,812)</b>
<b>Total experience (gain) or loss</b>		<b>\$789,424</b>
<b>Final Unfunded Actuarial Accrued Liability (after any changes)</b>		
Actuarial Accrued Liability after assumption changes	\$58,870,176	
Less Actuarial Value of Assets	51,013,888	
<b>01/01/2017 Unfunded Actuarial Accrued Liability after changes</b>		<b>\$7,856,288</b>
<b>Change in Unfunded Actuarial Accrued Liability Due to:</b>		
	(Gain)/Loss	
Change in assumptions	\$978,132	

### Funding Calculations

## Schedule of Amortization Bases

Your cost method allocates a portion of plan funding to be amortized in equal annual installments, rather than to be paid through future normal costs. The following amortization periods will be applied consistently to any amortization bases created.

- Initial Unfunded Actuarial Accrued Liability: 15 years
- Experience gains/losses: 10 years.
- Amendments: 15 years
- Assumption changes: 10 years

Date Created	Reason	Initial Balance	Remaining Period (Years)	Outstanding Balance	Annual Amortization
01/01/2017	Assumption	978,132	10	978,132	126,565
01/01/2017	Experience (gain)/loss	789,424	10	789,424	102,147
01/01/2016	Experience (Gain)/Loss	(186,503)	9	(172,682)	(24,155)
01/01/2016	Assumption	(637,308)	9	(590,080)	(82,542)
01/01/2015	Experience (Gain)/Loss	(528,764)	8	(447,849)	(68,550)
01/01/2015	Assumption	562,069	8	476,058	72,868
01/01/2014	Experience (Gain)/Loss	(1,228,910)	7	(861,272)	(146,501)
01/01/2014	Benefit Freeze	(5,777,832)	12	(5,013,445)	(570,552)
01/01/2013	Initial Unfunded Liability	15,527,955	11	12,698,002	1,534,745
<b>Total</b>				<b>7,856,288</b>	<b>944,025</b>

# Data and Assumptions

## Plan Assets

We measure your plan's assets at the beginning of each plan year. Plan assets reflect all contributions made for prior plan years. Contributions you may have already made for the 2017 plan year are not included.

Both market value and actuarial value for the 2017 plan year are shown below.

### Market Value of Assets

Investments held by the Principal Financial Group	\$48,979,866
2016 contributions received on or after 01/01/2017	199,145
<b>Total Market Value of Assets</b>	<b>\$49,179,011</b>

### Actuarial Value of Assets

Your plan's actuarial value of assets is a smoothed value instead of the market value. Using a smoothing method allows you to soften the volatility of assets from year to year. The Actuarial Value of Assets is used to calculate your ADC.

The actuarial value of assets held by Principal Financial Group is determined on a combined basis. See the following page for the development of this value.

Investments held by the Principal Financial Group	\$50,814,743
2016 contributions received on or after 01/01/2017	199,145
<b>Total Actuarial Value of Assets</b>	<b>\$51,013,888</b>

### Calculation of Actuarial Value

To determine the actuarial value of Investments held by the Principal Financial Group we have adjusted the market value by:

- Subtracting any remaining deferred appreciation in excess of expected investment earnings.
- Adding any remaining deferred appreciation short of expected investment earnings (shortfall).

Of the total excess appreciation or shortfall for any one plan year, 25% is allocated to the current plan year and each of the next three plan years.

a)	Market value of assets as of 2016	\$48,124,260
b)	Contributions/transfers	597,434
c)	Benefit payments	(3,000,726)
d)	Expenses	(37,067)
e)	Expected 6.50% interest on (a, b, c, and d)	3,041,126
f)	Expected value of assets as of 01/01/2017 (a+b+c+d+e)	\$48,725,027
g)	Market value as of 01/01/2017	\$48,979,866
h)	Current year excess appreciation/(shortfall) (g-f)	254,839
i)	Adjustment to market value (sum of deferred amounts – see below)	(1,834,877)
j)	Actuarial value of assets (g-i)	<b>\$50,814,743</b>

### Allocation of Deferred Appreciation

Allocation Year	Plan Year			
	2014	2015	2016	2017
2014	\$894,798			
2015	894,798	\$(114,436)		
2016	894,797	(114,435)	\$(955,786)	
2017	894,797	(114,435)	(955,786)	\$63,710
2018		(114,435)	(955,786)	63,710
2019			(955,785)	63,710
2020				63,709
Total	\$3,579,190	\$(457,741)	\$(3,823,143)	\$254,839
Deferred	\$0	\$(114,435)	\$(1,911,571)	\$191,129
Adjustment to market value (sum of deferred amounts)				<b>\$(1,834,877)</b>

### Data and Assumptions



## Census Characteristics

	01/01/2016	01/01/2017	Change
<b>Number of Covered Participants</b>			
Actives	142	134	-8
Terminated Vested	59	52	-7
Disabled	5	6	+1
Retirees	157	166	+9
<b>Total</b>	<b>363</b>	<b>358</b>	<b>-5</b>

<b>Average Age</b>			
Actives	50.2	50.9	+0.7
Terminated Vested	53.5	52.9	-0.6
Disabled	58.4	58.8	+0.4
Retirees	69.7	70.0	+0.3
<b>All</b>	<b>59.3</b>	<b>60.2</b>	<b>+0.9</b>

<b>Monthly Accrued Retirement Benefits</b>			
Actives	\$321,415	\$305,539	-4.9%
Terminated Vested	37,214	30,736	-17.4%
Disabled	4,786	7,397	+54.6%
Retirees	234,523	247,571	+5.6%

The monthly accrued retirement benefit for active participants is the 12/31/2013 frozen benefit payable at age 65, including the annual 5.50% increase (if applicable) to age 65.

Included in the terminated vested participants is 1 deceased participant whose spouse will receive a qualified pre-retirement survivor annuity.

This census data does not include 4 non-participating spouses who are eligible for a benefit under a Qualified Domestic Relations Order (QDRO). However, the entire monthly pension benefits (for the participants and QDRO spouses) are included.

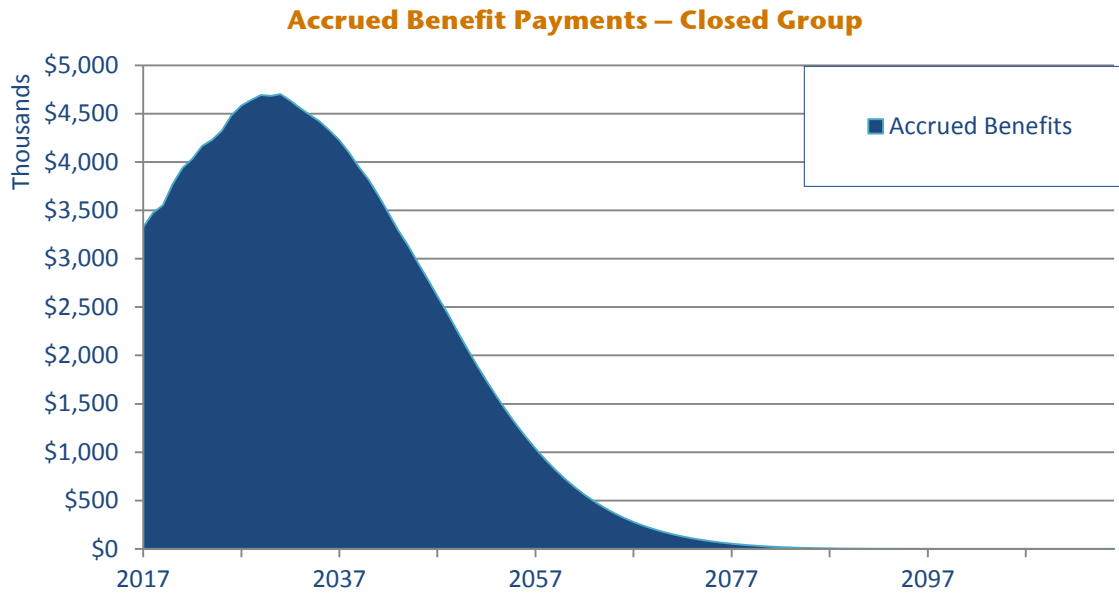
### Data and Assumptions

## Benefit Cash Flows

Benefit cash flows are the benefit payments expected to be paid from your plan assets. We provide cash flows to help you calculate and understand your plan obligations and the future liquidity needs of the plan.

You can compare your cash flows to the 01/01/2017 market value of assets, \$49,179,011, to evaluate your asset liquidity needs, and whether cash contributions in excess of the Actuarially Determined Contribution may be needed in the short term.

The cash flows are based on the 12/31/2013 frozen accrued benefits as of 01/01/2017 including the 5.5% future annual increases (if applicable) until assumed retirement age. The graph below shows the total benefits expected to be paid to current participants each plan year.



The table on the next page provides the details of this graph, showing the accrued benefits expected to be paid, by plan year. All benefit cash flows shown on these two pages are based on the demographic assumptions (retirement and withdrawal rates, mortality and form of benefit) as outlined in the [Assumptions and Methods](#), but do not reflect an interest discount.

## Benefit Cash Flow Detail

Year	Accrued Benefit Cash Flow	Year	Accrued Benefit Cash Flow	Year	Accrued Benefit Cash Flow
2017	3,327,866	2050	2,076,859	2083	14,580
2018	3,475,246	2051	1,903,337	2084	11,223
2019	3,553,084	2052	1,738,297	2085	8,503
2020	3,772,114	2053	1,581,157	2086	6,337
2021	3,938,036	2054	1,430,935	2087	4,643
2022	4,032,906	2055	1,291,107	2088	3,344
2023	4,165,460	2056	1,159,185	2089	2,365
2024	4,227,643	2057	1,036,732	2090	1,643
2025	4,322,396	2058	923,652	2091	1,123
2026	4,483,061	2059	819,775	2092	755
2027	4,582,434	2060	724,863	2093	499
2028	4,640,691	2061	638,582	2094	325
2029	4,692,180	2062	560,542	2095	209
2030	4,683,303	2063	490,279	2096	132
2031	4,701,419	2064	427,398	2097	83
2032	4,634,121	2065	371,444	2098	50
2033	4,556,699	2066	321,897	2099	30
2034	4,486,508	2067	278,213	2100	17
2035	4,418,111	2068	239,821	2101	10
2036	4,325,279	2069	206,161	2102	5
2037	4,225,095	2070	176,727	2103	3
2038	4,095,445	2071	151,023	2104	1
2039	3,946,738	2072	128,592	2105	1
2040	3,814,237	2073	109,062	2106	0
2041	3,650,022	2074	92,104	2107	0
2042	3,474,013	2075	77,414	2108	0
2043	3,294,650	2076	64,718	2109	0
2044	3,137,324	2077	53,778	2110	0
2045	2,959,568	2078	44,371	2111	0
2046	2,790,212	2079	36,312	2112	0
2047	2,612,252	2080	29,427	2113	0
2048	2,441,409	2081	23,587	2114	0
2049	2,256,537	2082	18,669	2115	0

## Plan Provisions

This report reflects the maximum benefit limits under Internal Revenue Code (IRC) Section 415 and maximum compensation limits under IRC Section 401 in effect on the first day of each plan year.

The following is a summary of plan provisions and does not alter the intent or meanings of the provisions contained in the contract or plan document. This report reflects the provisions of the December 31, 2013 plan restatement signed 09/24/2013 and plan amendment #1 signed 12/15/2015.

<b>Plan Eligibility</b>	
<b>Class</b>	Any full-time employee or any employee who works at least 1,040 hours in a calendar year or works during two consecutive calendar quarters.
<b>Plan Entry</b>	Entry into the plan is frozen September 26, 2012. After that date no employee or former employee will become an active participant, and no inactive participant or former participant will again become an active participant.

<b>Normal Retirement Benefit</b>	
<b>Age</b>	Attained age 65.
<b>Form</b>	Monthly annuity payable for life (optional forms may be elected in advance of retirement).
<b>Amount (Accrued Benefit)</b>	<p>1.5% of Average Compensation times service. The accrued benefit shall not be less than the accrued benefit as of December 31, 1988.</p> <p>The accrued benefit is frozen effective 12/31/2013 and will not increase due to any changes in average compensation or continuous service after this date.</p> <p>An Active participant's retirement benefit on his retirement date will be increased 5.5% per year from the later of (a) or (b) below:</p> <ul style="list-style-type: none"> <li>(a) December 31, 2013</li> <li>(b) The earlier of Normal Retirement Date or the date a participant attains age 55 and the sum of age and service is equal to 85 (or more).</li> </ul>

## Data and Assumptions

<b>Early Retirement Benefit</b>	
<b>Age</b>	Attained age 55.
<b>Service</b>	Completed 5 years of service.
<b>Form</b>	Same as Normal Retirement Benefit
<b>Amount</b>	If the sum of age and service is at least 85 (rule of 85), a participant will receive his accrued benefit unreduced for early retirement on his early retirement date. If the sum of age and service is less than 85, the benefit will be the accrued benefit reduced by 3% for each year his early retirement date precedes his normal retirement date.

<b>Late Retirement Benefit</b>	
<b>Age</b>	No maximum age
<b>Form</b>	Same as Normal Retirement Benefit.
<b>Amount</b>	Accrued benefit on late retirement date, increased by 5.5% for each year after the later of 12/31/2013, or the earlier of Normal Retirement Date and the date attained both rule of 85 and age 55.

<b>Termination Benefit</b>	
<b>Vesting Percentage</b>	100% after 5 years of vesting service.
<b>Form</b>	Same as Normal Retirement Benefit with income deferred until Normal Retirement Date.
<b>Amount</b>	Accrued Benefit on date of termination multiplied by the Vesting Percentage.

<b>Disability Benefit</b>	
<b>Eligibility</b>	Qualified for disability benefits under the Title II of the Federal Social Security Act.
<b>Service</b>	Ten years of vesting service.
<b>Form</b>	Monthly income payable until normal retirement, death, or recovery and a deferred annuity payable at the Normal Retirement Date.
<b>Amount</b>	Accrued Benefit on date of disability.

## Data and Assumptions

<b>Pre-Retirement Death Benefit</b>	
<b>Greater of A or B below for an active participant.</b>	
<b>A. Survivor Annuity Death Benefit (a vested benefit if termination occurs on or after age 55)</b>	
<b>Eligibility</b>	Attained age 55, 5 years of vesting service, and survived by a spouse on date of death.
<b>Form</b>	Monthly annuity payable to spouse.
<b>Amount</b>	The amount that would have been received had the participant elected a joint and 66 2/3% survivorship benefit option and early retired the day before death.
<b>B. Lump Sum Death Benefit (a nonvested benefit)</b>	
<b>Service</b>	Five years of service.
<b>Form</b>	Lump sum payable to beneficiary.
<b>Amount</b>	\$5,000 for the first year of service plus \$1,000 for each additional year of service.

<b>Postretirement Death Benefit</b>	
<b>Eligibility</b>	Participant who was active at time of retirement.
<b>Form</b>	Lump sum payable to beneficiary.
<b>Amount</b>	\$10,000.

<b>Definitions</b>	
<b>Average Compensation</b>	<p>The average of monthly compensation received for the 60 consecutive calendar months out of the latest 120 months which gives the highest average.</p> <p>The monthly compensation for December 2013 includes sick leave, vacation, and personal time accrued but not used as of 12/31/2013.</p> <p>The December, 2013 monthly compensation will not include unused sick leave if a participant terminates prior to the earlier of meeting the requirements for early retirement (age 55 with 5 years of service) or normal retirement (age 65).</p>
<b>Optional Forms of Benefit Payments</b>	<p>The optional forms of benefit payments are:</p> <ul style="list-style-type: none"> <li>• Monthly annuity payable for life, or 5, 10, or 15 years certain and life</li> <li>• Monthly annuity payable as a survivorship life annuity with survivorship percentages of 50, 66 2/3, 75 or 100</li> </ul> <p>The optional form conversion basis is 7.5% interest and the mortality table in Revenue Ruling 95-6 for payments other than lump sums.</p>

## Assumptions and Methods

The following assumptions and methods are used in this year's valuation report. The rationale for each non-prescribed economic and demographic assumption is also included. Some assumptions rely on the **Principal RAS Long-Term Capital Market Assumptions (CMA) 2016**. These assumptions are developed focusing on forward-looking market indicators and valuation models, as well as utilizing the analysis of historical data and trends, the outlook and forecasts from credible economic studies, and investment expert opinions. See [Long Term Capital Market Assumptions 2016](#) for additional information.

### Assumptions and Method Changes Since Last Year

#### Assumption Changes

We updated the following assumptions for your plan:

	2016	2017
<b>Liability Interest and Asset Return</b>	6.50%	6.25%
<b>Mortality</b>	Adjusted RP-2014 Mortality with Scale MP-2015, based on data published by the SOA in 2015.	Adjusted RP-2014 Mortality with Scale MP-2016, based on data published by the SOA in 2016.

#### Net Effect of Assumption Changes

The net effect of the assumption changes is to increase the Actuarially Determined Contribution.

#### Method Changes

No methods affecting the comparability of results were changed since the last valuation report was completed.



## Assumptions Selected by Actuary

<b>Liability Interest</b>	<p>During Benefit Payment Period 6.25%</p> <p>Before Benefit Payment Period 6.25%</p> <p>The interest rate is developed as a long-term expected geometric return on plan assets. Arithmetic expected return is calculated as the weighted average of broad asset classes' arithmetic returns of the plan's target asset allocation, and then converted to the geometric under lognormal distribution assumption. For details, see Long-Term Capital Market Assumptions link.</p>																								
<b>Asset Return</b>	<p>6.25% for the current plan year.</p> <p>See Liability Interest rate for how this rate was determined.</p>																								
<b>Expected Expense</b>	<p>The expected expense included in Normal Cost is an estimate based on prior year expenses paid from plan assets.</p> <p>This is the best estimate available of upcoming year's expenses.</p>																								
<b>Retirement</b>	<p>Active Participants are assumed to retire using the following percentages:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="background-color: #c07040; color: white;">Age</th> <th style="background-color: #c07040; color: white;">Percentage</th> </tr> </thead> <tbody> <tr><td style="text-align: center;">55</td><td style="text-align: center;">25%</td></tr> <tr><td style="text-align: center;">56</td><td style="text-align: center;">15%</td></tr> <tr><td style="text-align: center;">57</td><td style="text-align: center;">5%</td></tr> <tr><td style="text-align: center;">58</td><td style="text-align: center;">5%</td></tr> <tr><td style="text-align: center;">59</td><td style="text-align: center;">5%</td></tr> <tr><td style="text-align: center;">60</td><td style="text-align: center;">5%</td></tr> <tr><td style="text-align: center;">61</td><td style="text-align: center;">5%</td></tr> <tr><td style="text-align: center;">62</td><td style="text-align: center;">20%</td></tr> <tr><td style="text-align: center;">63</td><td style="text-align: center;">5%</td></tr> <tr><td style="text-align: center;">64</td><td style="text-align: center;">10%</td></tr> <tr><td style="text-align: center;">65</td><td style="text-align: center;">100%</td></tr> </tbody> </table> <p>This assumption is based on the results of recent experience analysis and anticipated future experience. Some participants retire early since the plan provides an early retirement subsidy beginning at age 55.</p> <p>Inactive participants are assumed to retire at age 65.</p>	Age	Percentage	55	25%	56	15%	57	5%	58	5%	59	5%	60	5%	61	5%	62	20%	63	5%	64	10%	65	100%
Age	Percentage																								
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<p><b>Mortality</b></p>	<p><b>Rates:</b> Adjusted RP-2014 Mortality (baseline mortality table as of 2006 based on experience study data for private pension plans underlying RP-2014).</p> <p><b>Mortality Improvement (MI):</b> MP-2016.</p> <p><b>During Benefit Payment Period</b> Above table with generational MI, Annuitant, male and female.</p> <p><b>Before Benefit Payment Period</b> Above table with generational MI, Non-annuitant, male and female.</p> <p>The Society of Actuaries (SOA) is an actuarial organization that periodically reviews mortality data and publishes mortality tables and improvement scales. This table and improvement scale is based on the most current data available published by the SOA in October 2016.</p>
<p><b>Disability</b></p>	<p>1987 Commissioner’s Group Disability Table, six month elimination period, male and female.</p> <p>We rely on a publicly published table due to the limited size of the plan. The 1987 CGDT was recommended by the Society of Actuaries for pension valuation purposes.</p>
<p><b>Withdrawal</b></p>	<p>2003 Society of Actuaries Small Plan Age Table, multiplied by 0.45.</p> <p>We rely on a publicly published table due to the limited size of the plan. The SOA Small Plan Age Table is the most recent withdrawal experience table published by the Society of Actuaries. A multiplier of 0.45 is applied to this table to reflect the results of the most recent experience analysis and anticipated future experience.</p>
<p><b>Marriage</b></p>	<p>75% married; husbands are 3 years older than wives.</p> <p>This assumption does not have material impact on the results of this report and has been selected based on our best estimate of active workforce.</p>
<p><b>Form of Benefit</b></p>	<p>Participants are assumed to receive their benefits on the normal form at the assumed retirement age.</p>

<b>Methods Selected by Plan Sponsor</b>	
<b>Actuarial Value of Plan Assets</b>	<p>The market value of the Principal Financial Group accounts is adjusted by spreading the expected value minus the actual value over four years.</p> <p>Contributions received in the current plan year but applied to the prior plan year are added to the actuarial value of the Principal Financial Group accounts.</p>
<b>Actuarial Cost Method</b>	<p>The <b>Entry Age Normal (EAN)</b> cost method is used for this valuation.</p> <p>The value in today's dollars for all projected plan benefits (reflecting service and pay increases through a member's assumed retirement age) is called the present value of benefits (<b>PVB</b>). The EAN method allocates each participant's PVB on a level basis over earnings or service between the participant's entry age and assumed retirement age.</p> <p>The portion of the PVB allocated to each valuation year is the normal cost (NC). The individual normal costs are totaled to become the plan's <b>Normal Cost</b>. The plan's Normal Cost as a percentage of pay (pay related plan) or a dollar amount (non-pay related plan) should remain fairly stable, but may vary over time as your plan's population changes. Since plan benefits were frozen at 12/31/2013, the accrual period ended at 12/31/2013, and all benefits are now considered fully accrued. Therefore, future normal costs for benefit accruals are \$0.</p> <p>The <b>Actuarial Accrued Liability (AAL)</b> is the portion of PVB attributable to past normal costs for all participants, and represents the targeted asset level for the plan. Because the plan is frozen, the actuarial accrued liability (AAL) is the present value of all future benefits payable, including potential actuarial increases for deferral as all benefits are fully accrued at 12/31/2013.</p> <p>The <b>Unfunded Actuarial Accrued Liability (UAAL)</b> is determined on each valuation date based on updated assets and data and compared to the expected UAAL based on the prior year's assumptions. Gains and losses (experience different than what was assumed) will increase or decrease the funding shortfall and create new liability bases to be funded. New bases are also created with plan amendments, assumption changes, or method changes.</p> <p>The initial Unfunded Actuarial Accrued Liability, adjustments for benefit or assumption changes, and actuarial gain or loss are amortized as described on the <a href="#">Schedule of Amortization Bases</a> page.</p>

<b>Methods Selected by Actuary</b>	
<b>Retirees</b>	Assets and liabilities for current and future retirees are included.
<b>Vested Benefits</b>	<p>A benefit is included in vested benefits when the participant will meet age and service eligibility requirements at the valuation date. The benefit is multiplied by the participant's vesting percentage applicable to each benefit on the valuation date.</p> <p>The following ancillary benefits are always treated as nonvested: disability benefits payable to retirement age unless in pay status, and pre-retirement death benefits in excess of the Survivor Annuity Death Benefit except as noted in the Plan Provisions.</p>

## Actuary Statement

This report was prepared at the request of the sponsor of the plan named on the cover of this report. It provides information needed for plan funding. It is not to be used for plan termination estimates, accounting information, or other purposes. If these or other measures of liabilities are needed, please contact me.

In preparing this report, I have relied on:

- reports of participants, salary, and service provided by the plan sponsor as of the last day of the 2016 plan year.
- information for any retirees, beneficiaries, and alternate payees being paid by Principal Life Insurance Co as of the last day of the 2016 plan year, as reported by Principal Life Insurance Company.
- benefit, contribution, and expense transaction information for the preceding plan year, and the market value of assets reported as of the last day of the 2016 plan year by Principal Financial Group and the plan sponsor.
- plan documents on file with Principal Life Insurance Company, including changes as noted on the Summary of Plan Provisions page of this report.

Appropriate tests of reasonableness and accuracy have been made and reviewed. The information provided is adequate to support the results in this report.

I confirm that as the actuary for this pension plan, I am completely independent of the plan sponsor and any of its officers or key personnel. Neither I nor anyone closely associated with me has any relationship known to me which would impair my independence.

In my opinion, each assumption and method chosen by the actuary is reasonable (taking into account the experience of the plan and reasonable expectations). Each material economic assumption is consistent with other economic assumptions selected by the actuary for this measurement period. Note that several different assumptions may be reasonable for a given measurement, and different actuaries will apply different professional judgment and may choose different reasonable assumptions. Demographic assumptions are not expected to produce significant cumulative actuarial gains or losses over the measurement period, and the combined effect of the assumptions is reasonable.

I am a member of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein. To the best of my knowledge, this report is complete and accurate, and complies with all relevant pension actuarial standards and legal requirements.



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03/28/2017

Date

# Present Value of Accrued Plan Benefits

The current year present value of vested and nonvested accrued benefits are based on the assumptions and methods shown earlier in this report. The present value of non-vested benefits includes future 5.5% annual increases for benefits for which a participant is not yet eligible. For purposes of this report, these increases are considered to be already accrued, but not yet vested since a participant must continue employment to receive them.

All retiree liability is included below except for purchased annuities. These amounts below should not be used for other purposes such as estimating plan termination sufficiency.

The prior year present value of vested and nonvested accrued benefits are based on the assumptions shown in that year's valuation report.

	01/01/2017	01/01/2016
<b>Present Value of Vested Benefits</b>		
Participants in pay status	\$34,146,756	\$31,864,513
Inactive participants	2,142,872	2,589,487
Active participants	16,853,081	16,424,884
Total	\$53,142,709	\$50,878,884
<b>Present Value of Nonvested Benefits</b>		
Participants in pay status	\$0	\$0
Inactive participants (not in pay status)	0	0
Active participants	5,727,467	5,886,886
Total	\$5,727,467	\$5,886,886
<b>Total Present Value of Accumulated Plan Benefits</b>	<b>\$58,870,176</b>	<b>\$56,765,770</b>
Value of Future Service and Compensation	0	0
<b>Total Present Value of Projected Plan Benefits</b>	<b>58,870,176</b>	<b>56,765,770</b>

Change in Present Value of Accrued Plan Benefits	
<b>Present Value of Accumulated Plan Benefits as of 01/01/2016</b>	\$56,765,770
<b>Increase (decrease) during the year due to:</b>	
Increase for interest due to decrease in the discount period	3,593,787
Benefits paid	(3,000,726)
Plan experience	533,213
Plan amendment	0
Change in assumptions	978,132
<b>Present Value of Accumulated Plan Benefits as of 01/01/2017</b>	<b>\$58,870,176</b>

## Present Value of Accrued Plan Benefits

# Risk-Free Results

In the *Asset Allocation, Interest Rates and Actuarially Determined Contributions (ADC)* [section](#), we explained the difference between long term and risk-free returns. The table below shows your plan’s liabilities and assets on both the funding and risk-free interest rate basis.

- The difference in the liability amounts on a Funding Basis versus a Risk-Free Basis represents the additional assumed returns to be earned over the life of the plan; this is also referred to as the “risk premium”.
- The assets in the funding basis column reflect the asset method used to determine your plan’s ADC; the assets in the risk-free basis column are on a mark-to-market basis consistent with the risk-free liabilities.
- The Unfunded Actuarial Accrued Liability and Normal Cost on the Funding Basis are used to calculate your ADC. Those same measures on a Risk-Free Basis show you more conservative results; if the plan’s investment returns fall short of the Funding Basis interest rate, additional contributions will likely be needed.

	Actuarially Determined Contribution	Risk-Free Cost
Interest Rate	6.25%	3.11% <sup>1</sup>
Standard Deviation	9.3%	
Normal Cost <sup>2</sup>	\$0	\$0
Actuarial Accrued Liability	\$58,870,176	\$87,943,648
Market Value of Assets		\$49,179,011
Actuarial Value of Assets	\$51,013,888	
Unfunded Actuarial Accrued Liability	\$7,856,288	\$38,764,637
Present Value of Accrued Benefits	\$58,870,176	\$87,943,648

<sup>1</sup> The 30-year Treasury rate at 12/31/2016 was chosen as the risk-free interest rate. To isolate the impact of the interest rate, all other assumptions are the same. See the [Assumptions and Methods](#) for other assumptions.

<sup>2</sup> The Normal Cost does not include any expense estimate.

**Standard deviation** is one way to measure the potential volatility risk in the current asset portfolio. For example, a standard deviation close to 0% would represent a portfolio with minimal volatility risk. For this plan, about two-thirds of your actual annual returns are likely to fall within a range of -3.05% to 15.55% (6.25% +/- 9.3%).

# Historical Results

	2014	2015	2016	2017
<b>Plan Cost &amp; Funded Status Measures</b>				
<b>Funded Status of Accrued Benefits</b>				
Present Value of Accrued Benefits (PVAB)	\$54,728,852	\$56,352,197	\$56,765,770	\$58,870,176
Market Value of Assets (MVA)	49,788,262	50,674,441	48,124,260	49,179,011
<b>Under (Over)Funded PVAB</b>	<b>\$4,940,590</b>	<b>\$5,677,756</b>	<b>\$8,641,510</b>	<b>\$9,691,165</b>
<b>Accrued Benefit Funded Percentage</b>	<b>91%</b>	<b>90%</b>	<b>85%</b>	<b>84%</b>
<b>Funded Status of Actuarial Accrued Liability</b>				
Actuarial Accrued Liability (AAL)	\$54,728,852	\$56,352,197	\$56,765,770	\$58,870,176
Actuarial Value of Assets	46,749,763	48,701,079	50,325,690	51,013,888
<b>Unfunded Actuarial Accrued Liability</b>	<b>\$7,979,089</b>	<b>\$7,651,118</b>	<b>\$6,440,080</b>	<b>\$7,856,288</b>
<b>Funded Percentage</b>	<b>85%</b>	<b>86%</b>	<b>89%</b>	<b>87%</b>
<b>Actuarially Determined Contribution (ADC)</b>				
Employer Normal Cost	\$25,000	\$25,000	\$25,000	\$25,000
Amortization of Unfunded AAL	826,213	830,563	722,961	944,025
Interest	55,329	55,612	48,617	60,564
<b>Expected Employer ADC</b>	<b>\$906,542</b>	<b>\$911,175</b>	<b>\$796,578</b>	<b>\$1,029,589</b>
<b>Actual Contributions</b>				
Actual Employer contributions	\$906,542	\$911,175	\$796,578	--
<b>Percentage of Employer's ADC paid</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>--</b>
Liability Interest Rate	6.50%	6.50%	6.50%	6.25%
<b>Census at Beginning of Year</b>				
Number of Active Participants	160	154	142	134
Number of Terminated Vested Participants	60	58	59	52
Number of Disabled Participants	5	6	5	6
Number of Retirees	144	148	157	166
Total Participants	369	366	363	358
<b>Plan Maturity Measures</b>				
Non-active Employees as a Percentage of Total	57%	58%	61%	63%
In Pay Status PV Accrued Benefits as a Percentage of Total	51%	54%	56%	58%
<b>Achievement of Economic Assumptions</b>				
Expected Rate of Return	6.50%	6.50%	6.50%	6.25%
Actual Market Value Rate of Return	5.56%	(1.23)%	7.05%	--





#### For Additional Information

If you have any questions about the material covered in this report, please contact your Pension Actuarial Analyst, Connie R Huntrod, by:

- Phone – -1 -800-543-4015 extension 75856, or 515-247-5856
- Email – – Huntrod.Connie@principal.com

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