

Retirement Plan for Employees
of the School Board of the
City of Alexandria
4-35557

Actuarial valuation report

for the plan year beginning 09/01/2019
and ending 08/31/2020

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This report is for the defined benefit retirement plan named on the report cover. It may only be provided to other parties in its entirety and should not be altered. 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 is
\$5,332,912

- See [Funding calculations](#) for details.
- We have received \$1,565,326 in employee contributions for the current plan year.
- Contributing less than the actuarially determined contribution amount will increase your next year's amount.

Factors impacting current year costs

While completing this valuation, we reviewed the actuarial assumptions. The assumption changes we made are disclosed in the [Assumptions and methods](#) section of this report.

Your actuarially determined contribution increased from \$4,619,357 in 2018 to \$5,332,912 for 2019. This is due to:

- Benefits were earned last year by participants we had assumed would retire.
- The asset return for the prior year was less than last year's assumed interest rate.
- Contributions were less than the actuarially determined contribution.
- In general, we are recognizing that people are likely to live longer so the plan will need to pay benefits for a longer time.

You can compare your contributions to the actuarially determined contribution for each year in the Historical results section at the back of this report.

Contact your pension actuarial analyst, Michelle Schneider, at

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- 800-543-4015 extension 56211
- 515-235-6211

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

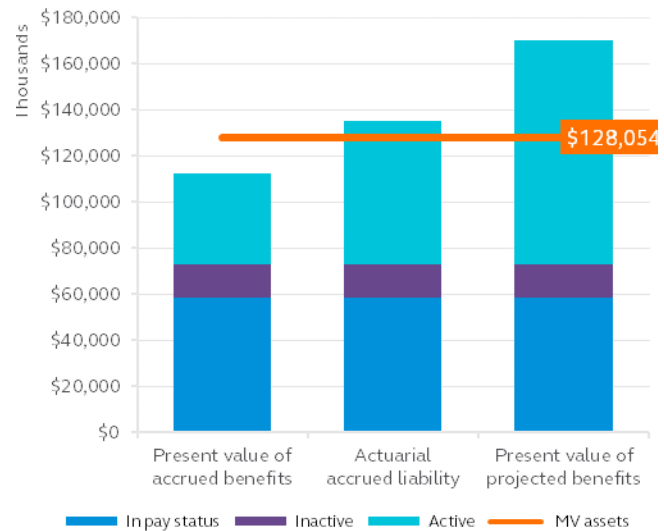
The table below compares the plan's 09/01/2019 market value of assets (the solid line) to 09/01/2019 plan liabilities measured using the assumptions we have made about future events. The liabilities assume:

- No one will enter the plan after the valuation date.
- Your asset allocation will remain the same with a return of 6.00% each year into the future.
- Plan participants will retire, die, terminate, and become disabled based on our assumptions.
- Annual pay per person will increase based on the [salary increase assumption](#).

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.



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.

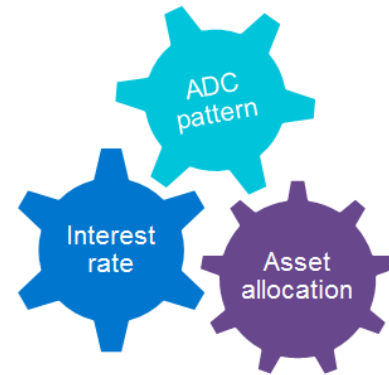
Understanding how your assets compare to your present value of accrued benefits is important. At a minimum you want to have enough assets in the plan to cover the present value of the benefits accrued to date.

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.

Understanding your plan's funded status

Asset allocation, interest rates and actuarially determined contribution (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 and 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.

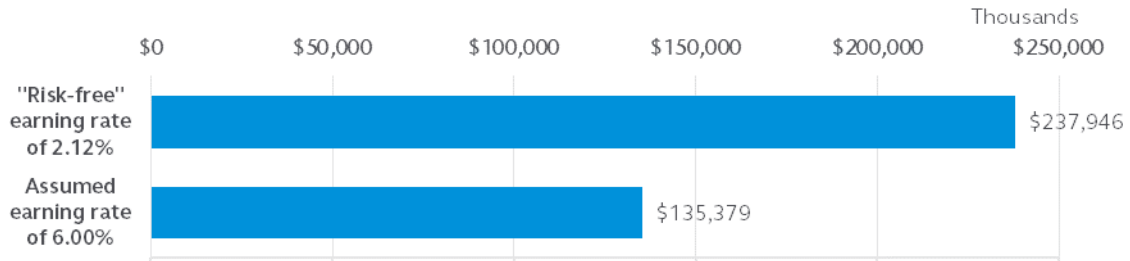
Asset allocations and interest rates

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 |
|---|---|---|
| Expected future returns (interest rates) based on | Your plan's asset allocation | Conservative interest rates such as U.S. Treasury instruments (<u>not</u> your plan's investment allocation) |
| Current effect | Lower ADC | Higher ADC |
| Later effect | Potentially higher ADC if returns fall below that assumed | Potentially lower ADC 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.

Actuarial accrued liability



As you can see above, higher expected returns generate a lower benefit liability. The additional assumed returns between funding basis (6.00%) and risk-free basis (2.12%) are referred to as “risk premium”. The \$102,567,000 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, salary experience, 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 salary experience, 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.

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 employee contributions made for the 2018 plan year is \$2,364,456, plus a receivable contribution of \$229,789.
- So far, cash contributions of \$ 1,565,326 have been received for the current plan year.

| Paid or date due | Plan year beginning 2018 | Plan year beginning 2019 | Plan year beginning 2020 |
|------------------|--------------------------|--------------------------|--------------------------|
| 10/22/2018 | \$216,887 | | |
| 11/19/2018 | 213,368 | | |
| 12/20/2018 | 212,353 | | |
| 01/21/2019 | 216,918 | | |
| 02/18/2019 | 213,843 | | |
| 03/11/2019 | 214,101 | | |
| 04/15/2019 | 214,030 | | |
| 05/06/2019 | 214,495 | | |
| 06/17/2019 | 215,839 | | |
| 07/23/2019 | 214,162 | | |
| 08/23/2019 | 218,460 | | |
| 09/20/2019 | 229,789 | | |
| 10/28/2019 | | \$226,234 | |
| 11/21/2019 | | 221,857 | |
| 12/16/2019 | | 222,862 | |
| 01/21/2020 | | 229,268 | |
| 02/18/2020 | | 222,900 | |
| 03/16/2020 | | 221,483 | |
| 04/20/2020 | | 220,722 | |
| 08/31/2021 | | | To be determined |

Funding calculations

Actuarially determined contribution

The actuarially determined contribution (ADC) consists of three parts:

- 1** Normal cost - the cost attributed to the current year (due to the continued accrual of plan benefits for active employees) and plan expenses.
- 2** Amortization of any unfunded accumulated past costs (unfunded actuarial accrued liability).
- 3** Interest on 1 and 2 above to the end of the plan year.



| | |
|---|-------------|
| Employer normal cost | \$5,031,049 |
| Plus valuation interest to the end of the plan year | 301,863 |

Your actuarially determined contribution (ADC) is **\$5,332,912**

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.

| | |
|---|---------------|
| a) Present value of projected benefit | \$169,865,275 |
| b) Actuarial value of assets | 128,053,947 |
| c) Present value of future normal costs (a-b) | 41,811,328 |
| d) Present value of future compensation | 1,387,549,163 |
| e) Current annual compensation | 157,834,071 |
| f) Normal cost (c /d * e) | 4,756,049 |
| g) Estimated expenses | 275,000 |

| | |
|--------------------------|--------------------|
| Total normal cost | \$5,031,049 |
|--------------------------|--------------------|

| | |
|---|-------------|
| Projected compensation for the current year | 157,834,071 |
|---|-------------|

| | |
|--|-------|
| Total normal cost as a percentage of member compensation | 3.19% |
|--|-------|

Actuarial accrued liability (AAL) and Present Value of Projected Benefits (PVPB)

| | PVPB | AAL |
|--|----------------------|----------------------|
| Active participants | \$96,774,206 | \$62,287,753 |
| Inactive participants | 14,829,687 | 14,829,687 |
| Participants and beneficiaries in pay status | 58,261,382 | 58,261,382 |
| Total | \$169,865,275 | \$135,378,822 |

Data and assumptions

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 2019 plan year are not included.

Both market value and actuarial value for the 2019 plan year are shown below.

| | Actuarial value | Market value |
|---|----------------------|----------------------|
| Principal Life Insurance Company Flexible Pension Investment (FPI) grouped accounts | \$127,824,158 | \$127,824,158 |
| Value of 2018 contributions received on or after 09/01/2019 | 229,789 | 229,789 |
| Total value | \$128,053,947 | \$128,053,947 |

Actuarial value of assets

Your plan's actuarial value of assets is the market value. See [Methods selected by plan sponsor](#) section of Assumptions and methods. The actuarial value of assets is used to calculate your actuarially determined contribution (ADC).

Census characteristics

| | 09/01/2018 | 09/01/2019 | Change |
|--|---------------|---------------|--------|
| Number of covered participants | | | |
| Actives | 2,208 | 2,517 | +309 |
| Terminated vested | 1,347 | 1,600 | +253 |
| Disabled | 16 | 16 | +0 |
| Retirees | 1,261 | 1,270 | +9 |
| Total | 4,832 | 5,403 | +571 |
| Average age | | | |
| Actives | 44.5 | 43.7 | -0.8 |
| Terminated vested | 47.2 | 47.1 | -0.1 |
| Disabled | 62.2 | 63.2 | +1.0 |
| Retirees | 73.6 | 73.9 | +0.3 |
| All | 52.9 | 51.9 | -1.0 |
| Reported annual payroll | | | |
| Actives | \$149,826,081 | \$157,938,950 | +5.4% |
| Average pay per active | 67,856 | 62,749 | -7.5% |
| Average years of service | | | |
| Actives | 9 | 8 | -11.1% |
| Monthly projected retirement benefits | | | |
| Actives | \$3,386,119 | \$3,562,540 | +5.2% |
| Terminated vested | 169,521 | 185,817 | +9.6% |
| Disabled | 4,852 | 4,852 | +0.0% |
| Retirees | 485,874 | 498,401 | +2.6% |

Data and assumptions

Benefit cash flows

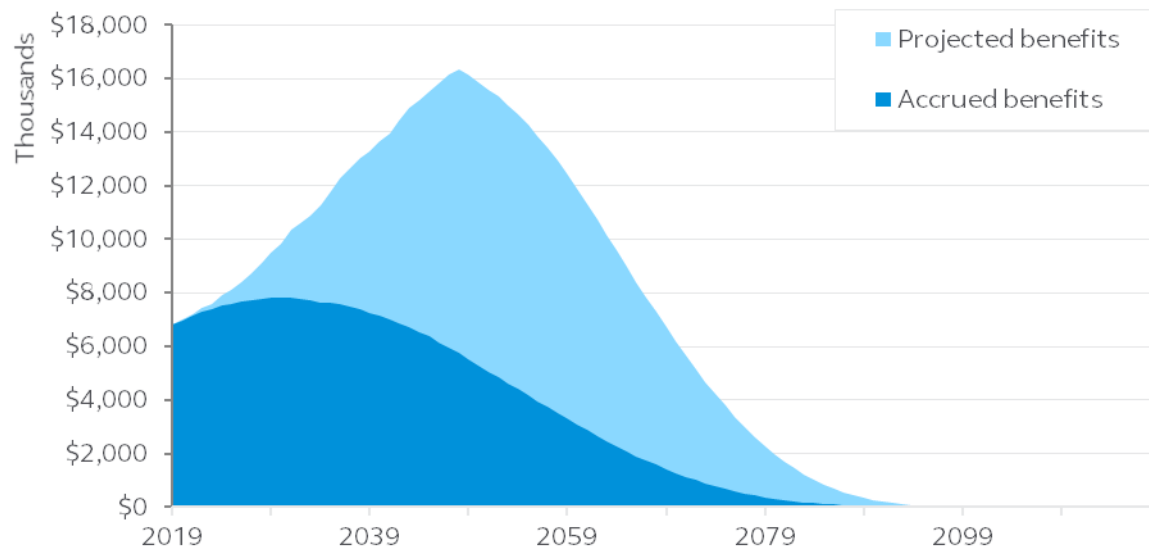
Benefit cash flows are the benefit payments expected to be paid from your plan assets. We provide cash flows to help you calculate and understand your plan obligations and the future liquidity needs of the plan.

You can compare your cash flows to the 09/01/2019 market value of assets, \$128,053,947, to evaluate your asset liquidity needs, and whether cash contributions in excess of the actuarially determined contribution may be needed in the short term.

Benefit cash flows can be based on either the current plan participants (“closed group”) or a group that assumes future new entrants (“open group”). The benefit payments could be based on the accrued benefits or the projected plan benefits (reflecting future service and salary increases).

In this report, we are showing you the benefit cash flows for a closed group. The graph below shows the total benefits expected to be paid for current participants (closed group). The split between benefits already accrued and those to be earned in the future is indicated on the graph. The top line represents the total projected benefits expected to be paid in each plan year.

Accrued and projected benefit payments - closed group



The table on the next page provides the details of this graph, showing the accrued and projected 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, salary growth, and form of benefit) as outlined in the [Assumptions and methods](#), but do not reflect an interest discount.

Data and assumptions

Benefit cash flow detail

| Year | Accrued benefit cash flow | Projected benefits cash flow | Year | Accrued benefit cash flow | Projected benefits cash flow | Year | Accrued benefit cash flow | Projected benefits cash flow |
|------|---------------------------|------------------------------|------|---------------------------|------------------------------|------|---------------------------|------------------------------|
| 2019 | 6,806,246 | 6,806,246 | 2052 | 4,849,551 | 15,318,622 | 2085 | 116,903 | 840,902 |
| 2020 | 6,971,457 | 6,990,811 | 2053 | 4,626,796 | 14,979,872 | 2086 | 93,002 | 687,768 |
| 2021 | 7,155,290 | 7,213,212 | 2054 | 4,418,211 | 14,678,432 | 2087 | 73,098 | 556,060 |
| 2022 | 7,286,177 | 7,415,006 | 2055 | 4,188,807 | 14,278,001 | 2088 | 56,719 | 444,111 |
| 2023 | 7,369,530 | 7,580,604 | 2056 | 3,964,973 | 13,867,744 | 2089 | 43,405 | 350,098 |
| 2024 | 7,521,462 | 7,893,325 | 2057 | 3,743,002 | 13,430,409 | 2090 | 32,730 | 272,183 |
| 2025 | 7,594,936 | 8,128,675 | 2058 | 3,523,103 | 12,961,584 | 2091 | 24,295 | 208,503 |
| 2026 | 7,660,225 | 8,386,929 | 2059 | 3,303,036 | 12,448,700 | 2092 | 17,736 | 157,232 |
| 2027 | 7,729,283 | 8,727,680 | 2060 | 3,085,582 | 11,899,642 | 2093 | 12,723 | 116,618 |
| 2028 | 7,771,079 | 9,105,094 | 2061 | 2,873,090 | 11,331,964 | 2094 | 8,958 | 84,989 |
| 2029 | 7,805,240 | 9,487,222 | 2062 | 2,666,192 | 10,747,229 | 2095 | 6,186 | 60,803 |
| 2030 | 7,799,556 | 9,823,976 | 2063 | 2,465,826 | 10,162,091 | 2096 | 4,185 | 42,657 |
| 2031 | 7,831,774 | 10,357,941 | 2064 | 2,272,013 | 9,575,796 | 2097 | 2,771 | 29,318 |
| 2032 | 7,757,190 | 10,613,508 | 2065 | 2,085,297 | 8,991,454 | 2098 | 1,794 | 19,721 |
| 2033 | 7,709,396 | 10,884,368 | 2066 | 1,906,130 | 8,411,607 | 2099 | 1,135 | 12,969 |
| 2034 | 7,637,411 | 11,272,804 | 2067 | 1,734,925 | 7,838,664 | 2100 | 701 | 8,331 |
| 2035 | 7,612,961 | 11,801,750 | 2068 | 1,572,048 | 7,274,946 | 2101 | 422 | 5,222 |
| 2036 | 7,564,811 | 12,295,412 | 2069 | 1,417,835 | 6,722,814 | 2102 | 248 | 3,191 |
| 2037 | 7,479,913 | 12,645,310 | 2070 | 1,272,567 | 6,184,638 | 2103 | 142 | 1,899 |
| 2038 | 7,374,494 | 13,037,271 | 2071 | 1,136,434 | 5,662,653 | 2104 | 79 | 1,101 |
| 2039 | 7,244,727 | 13,256,216 | 2072 | 1,009,542 | 5,158,951 | 2105 | 43 | 621 |
| 2040 | 7,129,619 | 13,639,187 | 2073 | 891,928 | 4,675,507 | 2106 | 23 | 341 |
| 2041 | 6,994,885 | 13,967,416 | 2074 | 783,540 | 4,214,075 | 2107 | 12 | 182 |
| 2042 | 6,848,528 | 14,422,754 | 2075 | 684,227 | 3,776,155 | 2108 | 6 | 95 |
| 2043 | 6,713,041 | 14,892,639 | 2076 | 593,763 | 3,363,005 | 2109 | 3 | 48 |
| 2044 | 6,545,436 | 15,171,622 | 2077 | 511,856 | 2,975,642 | 2110 | 1 | 24 |
| 2045 | 6,360,399 | 15,515,070 | 2078 | 438,171 | 2,614,829 | 2111 | 1 | 12 |
| 2046 | 6,163,490 | 15,824,838 | 2079 | 372,327 | 2,281,061 | 2112 | 0 | 5 |
| 2047 | 5,968,052 | 16,155,162 | 2080 | 313,917 | 1,974,617 | 2113 | 0 | 2 |
| 2048 | 5,741,212 | 16,342,981 | 2081 | 262,493 | 1,695,469 | 2114 | 0 | 1 |
| 2049 | 5,510,874 | 16,153,063 | 2082 | 217,580 | 1,443,272 | 2115 | 0 | 0 |
| 2050 | 5,285,223 | 15,878,683 | 2083 | 178,684 | 1,217,416 | 2116 | 0 | 0 |
| 2051 | 5,058,862 | 15,580,206 | 2084 | 145,295 | 1,016,997 | 2117 | 0 | 0 |

Data and assumptions

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 plan signed 03/03/2016.

Plan eligibility

Class Full-time employee.

Normal retirement benefit

Age Earlier of (i) attained age 65 or (ii) attained age 50 and completion of 30 years of service.

Form Monthly annuity payable for life with total payments guaranteed to be at least equal to his participant's accumulation at retirement.

Amount (accrued benefit) Equal to the of a), b), and c) below:

- a) 0.40% of average compensation multiplied by accrual service on and after September 1, 1984
- b) 1.625% of 09/01/1984 past service compensation not in excess of \$100 plus .25% of the amount by which the 09/01/1984 past service average compensation exceeds \$100, multiplied by accrual service after July 1, 1971 and prior to September 1, 1984
- c) 1.625% of past service compensation not in excess of \$100 plus .25% of the amount by which past service compensation exceeds \$100, multiplied by accrual service prior to July 1, 1971.

Early retirement benefit

Age Attained age 55.

Service Completed 5 years of service.

Form Same as normal retirement benefit.

Amount Accrued Benefit on Early Retirement Date reduced by 6 2/3% for each year up to five and 3 1/3% for each year between five and ten that the Early Retirement Date precedes Normal Retirement Date.

Data and assumptions

Late retirement benefit

| | |
|---------------|--|
| Age | No maximum age. |
| Form | Same as normal retirement benefit. |
| Amount | Accrued Benefit on Late Retirement Date. |

Termination benefit

| | |
|---------------------------|--|
| Vesting percentage | 100% after 5 years of vesting service or attained age 60. |
| Form | Same as normal retirement benefit with income deferred until normal retirement date. |
| Amount | Accrued Benefit on date of termination multiplied by the Vesting Percentage. A participant who terminates may elect to receive the participant's accumulation immediately in lieu of any and all retirement benefits that otherwise might be payable. |

Disability benefit

| | |
|--------------------|--|
| Eligibility | Active participant with five years of service. |
| Form | Monthly income payable until normal retirement, death, or recovery and a deferred annuity payable at the normal retirement date. |
| Amount | The lesser of (a) or (b): <ul style="list-style-type: none">(a) Benefit at age 60.(b) Twice the amount of his accrued benefit on date of disability. |

Pre-retirement death benefit

Greater of A or B below.

A. Lump sum death benefit

| | |
|---------------|---|
| Form | Lump sum benefit payable to beneficiary. |
| Amount | Participant's accumulations on date of death. |

B. Spouse annuity – for active participants only

| | |
|----------------|--|
| Age | Attained age 55. |
| Service | 30 years of service. |
| Form | Monthly annuity payable to spouse. |
| Amount | Not less than would have been received had the participant elected a joint and 50% survivorship benefit option and early retired the day before death. |

Contributions

| | |
|-----------------|---|
| Employer | 1% of each participant's monthly salary which will be allocated to that individual plus any other necessary contributions. These allocated contributions ceased on September 1, 1994. |
|-----------------|---|

Definitions

| | |
|---|---|
| Average compensation | The monthly average of the three consecutive annual salaries which give the highest average while a plan participant. |
| Past service compensation | Monthly compensation as of July 1, 1971 (September 1, 1971 for a ten month employee). |
| Participant's accumulation | Participant's contributions with interest at 2% per annum up to July 1, 1982, plus any allocated employer contributions all with interest at 5% per annum on and after September 1, 1982. |
| Optional forms of benefit payments | <p>The optional forms of benefit payments are:</p> <ul style="list-style-type: none">• Monthly annuity payable for life, or 5, 10, or 15 years certain and life.• Monthly annuity payable as a survivorship life annuity with survivorship percentages of 50, 66 2/3, or 100.• Monthly annuity payable for life with Social Security adjustment option.• Monthly annuity for life with modified cash refund of the Participant's accumulation. <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> <p>The optional form conversion basis uses the applicable interest rate and applicable mortality table as set forth in Code Section 417 for lump sum payments. The applicable interest rate uses the second calendar month preceding the first day of the stability period which is the plan year.</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 economic assumptions rely on the Principal RAS Long-Term Capital Market Assumptions (CMA) 2018. 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 2018](#) for additional information.

Changes since last year

Assumption changes

We changed the following assumptions for your plan:

- The mortality base table has been changed from RP2006 to Pri-2012.
- We also updated the mortality improvement scale to reflect historical U.S. mortality data to 2016.
- The inflation assumption has increased from 2.00% to 2.25%.
- The wage base increase has increased from 3.00% to 3.25%.
- The compensation limit increase has increased from 2.00% to 2.25%.

Net effect of assumption changes

The net effect of the assumption changes is to decrease 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

| | |
|---|---|
| Liability interest | During benefit payment period 6.00% |
| | Before benefit payment period 6.00% |
| | 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. |
| Interest rate for employee accumulations | 5.00% |

Data and assumptions

| Expected expense | <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> | | | | | | | | |
|------------------------------------|--|-----|-------------------|----|-------|----|-------|----|-------|
| Retirement | <p>Active and inactive participants are assumed to retire at normal retirement age as defined in Plan provisions.</p> <p>This assumption is based on the results of recent experience analysis and anticipated future experience.</p> | | | | | | | | |
| Inflation | <p>2.25% increase per year.</p> <p>See Long-Term Capital Market Assumptions link.</p> | | | | | | | | |
| Upcoming salary increases | <p>The preceding year's salary is increased using the S-5 Table from The Actuary's Pension Handbook, increased by 3.00% at each age. This table provides a rate of increase that declines as participants age.</p> <p>Note: not used for Plan accounting calculations.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">Age</th> <th style="text-align: center;">Upcoming increase</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">25</td> <td style="text-align: center;">7.18%</td> </tr> <tr> <td style="text-align: center;">40</td> <td style="text-align: center;">5.72%</td> </tr> <tr> <td style="text-align: center;">55</td> <td style="text-align: center;">4.88%</td> </tr> </tbody> </table> <p>Expected salary increase is composed of salary inflation, a real wage growth and a merit increase.</p> | Age | Upcoming increase | 25 | 7.18% | 40 | 5.72% | 55 | 4.88% |
| Age | Upcoming increase | | | | | | | | |
| 25 | 7.18% | | | | | | | | |
| 40 | 5.72% | | | | | | | | |
| 55 | 4.88% | | | | | | | | |
| Compensation limit increase | <p>2.25% increase per year.</p> <p>Compensation limit increase should be consistent with the inflation assumption.</p> | | | | | | | | |
| Wage base increase | <p>3.25% per year.</p> <p>Real wage growth combined with inflation assumption indicates an economic assumption of social security national wage growth in pension plan valuations. Based on historic real growth in National Average Wages (from 1951) and Social Security estimate of around 1%, our best estimate places this assumption in the range of 0.75% to 1.25% above inflation.</p> | | | | | | | | |

Mortality

Based on Pri-2012 Total dataset base rate mortality table projected generationally using the Principal Mortality Improvement Scale (Principal 2015-10).

Base rates

Before benefit payment period

Employee amount-weighted, male and female

During benefit payment period

Retiree amount-weighted, male and female

The Society of Actuaries is an actuarial organization that periodically reviews mortality data and publishes mortality tables and improvement scales. In October 2019, the SOA released the Pri-2012 Mortality Tables for private-sector retirement plans in the U.S. The Pri-2012 report contains different sets of mortality tables based on complete dataset or various subsets. The Total dataset base rate table was selected based on information provided by the plan sponsor.

Pri-2012 section 12.4. provided three approaches for designated beneficiaries in the calculation of joint-and-survivor annuities. We believe "Approach 1" is reasonable for this plan and has been selected due to data limitations in identifying contingent survivors. In addition, we believe beneficiary mortality isn't materially different while both participants are alive.

Mortality improvement (MI)

Principal 2015-10 MI scale: this scale is based on MP-2019 study and model issued by SOA with the exception of the following user-selected assumptions:

- 10-year convergence period on age and cohort
- Long-term rates (LTR) assumptions using sex-distinct and age-based rates developed from Social Security Trustees Reports.

See [Mortality Documentation](#) for rationale and additional information.g

Disability

1987 Commissioner's Group Disability Table, six month elimination period, male and female.

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.

Withdrawal

V Table from August 1992 Pension Forum published by the Society of Actuaries, multiplied by 1.30.

Data and assumptions

| | |
|------------------------|--|
| Marriage | 75% married; husbands are 3 years older than wives. 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. |
| Form of benefit | Participants are assumed to receive their benefits on the normal form at the assumed retirement age. |

Methods selected by plan sponsor

| | |
|---------------------------------------|--|
| Actuarial value of plan assets | Market value The face value of contributions received in the current plan year but applied to the prior plan year is added to the market value. |
| Actuarial cost method | <p>The entry age normal (EAN) 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 (PVB). 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 normal cost. 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.</p> <p>The actuarial accrued liability (AAL) is the portion of PVB attributable to past normal costs for all participants, and represents the targeted asset level for the plan.</p> <p>The unfunded actuarial accrued liability (UAAL) 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 Schedule of amortization bases page.</p> |

Methods selected by actuary

| | |
|------------------------|---|
| Retirees | Assets and liabilities for current and future retirees are included. |
| Vested benefits | <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 2018 plan year.
- information for any retirees, beneficiaries, and alternate payees being paid by Principal Life Insurance Co as of the last day of the 2018 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 2018 plan year by Principal 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.



05/01/2020

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Data and assumptions

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. 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.

| | 09/01/2019 | 09/01/2018 |
|---|----------------------|----------------------|
| Present value of vested benefits | | |
| Participants in pay status | \$58,261,382 | \$57,999,048 |
| Inactive participants | 14,829,687 | 13,855,207 |
| Active participants | 30,216,006 | 28,737,745 |
| Total | \$103,307,075 | \$100,592,000 |
| Present value of nonvested benefits | | |
| Participants in pay status | \$0 | \$0 |
| Inactive participants (not in pay status) | 0 | 0 |
| Active participants | 9,219,900 | 8,419,087 |
| Total | \$9,219,900 | \$8,419,087 |
| Total present value of accumulated plan benefits | \$112,526,975 | \$109,011,087 |
| Value of future service and compensation | 57,338,300 | 53,959,313 |
| Total present value of projected plan benefits | \$169,865,275 | \$162,970,400 |

Change in present value of accumulated plan benefits

| | |
|--|----------------------|
| Present value of accumulated plan benefits as of 09/01/2018 | \$109,011,087 |
| Increase (decrease) during the year due to: | |
| Increase for interest due to decrease in the discount period | 6,357,632 |
| Benefits paid | (6,191,280) |
| Benefits accumulated and plan experience | 3,865,991 |
| Change in assumptions | (516,455) |
| Plan amendment | 0 |
| Method changes | 0 |
| Present value of accumulated plan benefits as of 09/01/2019 | \$112,526,975 |

Risk assessment and historical information

Risk assessment

All defined benefit plans are exposed to risk. While some risks are within the control of the plan sponsor, others are influenced by outside economic and demographic conditions. Below are descriptions of some risk factors and consequences. It's not intended to be a comprehensive summary, but highlights issues many plan sponsors face. If you'd like to understand these risks more fully or are interested in additional analysis, please contact us.

Potential risks

Investment risk

Lower than expected investment returns could increase future actuarially determined contributions (ADC) and the ability to pay benefits. See [Risk-free results](#) where we also explain risk premium and how standard deviation is a way to measure potential volatility risk.

Interest rate risk

The interest rate used to discount plan benefits is a significant driver in the projection of plan liabilities. When interest rates decrease or increase, liabilities move in the opposite direction. See [Risk-free results](#) for alternative results using a different interest rate.

Asset/liability mismatch

Plan liabilities will fluctuate due to changes in assumed interest rates while asset values will change based on actual market returns and the plan's asset allocation. Liabilities and assets could potentially move in different directions or magnitudes due to risks associated with interest rates and investments. This mismatch could lead to significant changes in ADC and funded status. Studies such as Asset Liability Modeling on current and alternative liability driven investing strategies can assist with quantifying this mismatch risk.

Longevity and other demographic risks

Plan liabilities are based on several demographic assumptions as disclosed in the [Assumptions and methods](#). When actual plan experience differs from these expectations, the resulting gains and losses will impact future liability.

Contribution risk

Every pension plan should have a strategy for determining annual pension contributions. Contributing the ADC may or may not allow a plan sponsor to achieve their goals. For example, funding to 100% of obligations for benefits (using assumptions consistent with median expectations about future economic conditions) might require contributions in excess of the ADC. A specific contribution strategy should be implemented and reassessed periodically.

Intergenerational equity risk

Intergenerational equity refers to the desire for the full cost of pensions be paid by those receiving the benefits. Fully funding pension benefits over the average future service period reasonably aligns the cost with those who benefit from those services.

As a result, the amortization of future gains/losses due to experience, assumptions, and benefit changes should consider the average working life time of current employees. See [Schedule of amortization bases](#) for amortization periods for the plan.

Risk considerations

Below are some aspects of the plan as you consider plan risk.

Assumptions

We use [assumptions](#) to estimate the future experience of your plan. To the extent actual experience differs from these assumptions, plan results (such as ADC or funded ratio) may be impacted. Some examples include:

Assumed interest rates. Your ADC is determined using interest rates selected based on long-term geometric return on plan assets. If these returns are not realized, the ADC may increase in future years.

Demographic assumptions (such as mortality, withdrawal, retirement, and disability rates). Your plan's experience relative to the demographic assumptions could impact the cost of the plan.

Future new participants are not included.

Salary growth for future years.

Plan expenses for the upcoming year.

Plan assets

Asset values are reflected as of the valuation date. Future results will be impacted by actual market return on investments.

This plan's investments are subject to benefit index restrictions. Asset levels must be at or above a certain threshold to avoid any potential consequences of your contract.

Contributions

Typically, the plan sponsor contributes less than the ADC. This contribution policy may not be enough to cover future benefit obligations.

Key measures

Please see the [historical results](#) section of this report for key measures. We suggest you review these measures annually to ensure they meet the goals of the defined benefit plan and organization.

Achievement of economic assumptions

If the **actual market value rate of return** on plan assets differs than the **expected return**, the ADC will increase or decrease.

The actual return on assets has been volatile; the return for some years exceeded the expectation and at other times the return was less than expected. The return for the 2018 year was 3.60% compared to an expected return of 6.00%.

Ratio of normal cost to compensation

This ratio can be used to assess the cost of benefits attributed to a year to the participants' projected compensation for that year.

The ratio of current year normal cost to projected current year compensation is 3.19%. This ratio will fluctuate since it's impacted by salary experience, demographic changes, economic conditions, and other factors. If you anticipate changes to your workforce or salary structure, consider an estimate to determine the impact on plan funding.

Percentage of employer's ADC paid

This percentage is a measure of the extent to which the amount required to ensure funding goals (based on the plan's assumptions and methods) has been paid.

Plan maturity

Plan maturity measures assess the changing maturity profile of the plan and can indicate the level of reliance on active employees to absorb adverse experience.

Non-active employees as a percentage of total for the current year is 53%.

In pay status PV accrued benefits as a percentage of total is 52%.

A higher ratio is indicative of a more mature plan, typically resulting in:

- less sensitivity to liability interest rate changes
- greater volatility due to actual mortality experience

Annuity purchases could help alleviate risk associated with the retired portion of your plan liability. If you are considering an annuity purchase, please contact us to discuss potential costs and savings.

Market value of assets as a percentage of reported payroll is 81% for the current year.

Actuarial accrued liability (AAL) as a percentage of reported payroll is 86% for the current year.

Prior year benefits paid as a percentage of reported payroll is 4% for the current year.

Risk-free results

In the [Asset allocation, interest rates and actuarially determined contributions](#), 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.

| Risk premium | Assets | Results |
|---|--|--|
| 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 plan's investment returns fall short of the funding basis interest rate, **additional contributions will likely be needed.**

| | Funding basis (ADC) | Risk-free basis |
|---|----------------------|--------------------------|
| Interest rate | 6.00% | 2.12%¹ |
| Standard deviation | 8.3% | --- |
| Normal cost ² | \$3,926,308 | \$11,172,002 |
| Actuarial accrued liability | \$135,378,822 | \$237,945,539 |
| Market value of assets | N/A | \$128,053,947 |
| Actuarial value of assets | \$128,053,947 | N/A |
| Unfunded actuarial accrued liability | \$7,324,875 | \$109,891,592 |
| Present value of accrued benefits | \$112,526,975 | \$196,592,629 |

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 of -2.3% to 14.3% (6.00% +/- 8.3%)

¹ The 30-year Treasury rate at 08/31/2019 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.

² The normal cost does not include any expense estimate or a reduction for estimated employee contributions.

Historical results

| | 2013 | 2014 | 2015 |
|---|-----------------------|-----------------------|-----------------------|
| Funded status of accrued benefits | | | |
| Present value of accrued benefits (PVAB) | \$80,142,485 | \$82,899,909 | \$92,605,473 |
| Market value of assets (MVA) | 108,784,515 | 118,777,776 | 113,930,976 |
| Under (over) funded PVAB | \$(28,642,030) | \$(35,877,867) | \$(21,325,503) |
| Accrued benefit funded percentage | 136% | 143% | 123% |
| Funded status of present value of projected benefits | | | |
| Present value of projected benefit (PVPB) | \$116,658,644 | \$120,284,833 | \$123,515,894 |
| Actuarial value of assets | 108,784,515 | 118,777,776 | 113,930,976 |
| Unfunded actuarial accrued liability | \$7,874,129 | \$1,507,057 | \$9,584,918 |
| Funded percentage | 93% | 99% | 92% |
| Normal cost | | | |
| Total normal cost (NC) | \$1,084,185 | \$329,023 | \$1,303,402 |
| Actuarially determined contribution (ADC) | | | |
| Employer normal cost | \$1,084,185 | \$329,023 | \$1,303,402 |
| Interest | 70,472 | 21,386 | 84,721 |
| Expected Employer ADC | \$1,154,657 | \$350,409 | \$1,388,123 |
| Liability Interest Rate | 6.50% | 6.50% | 6.50% |
| Projected current year compensation | \$125,394,314 | \$130,435,895 | \$130,748,192 |

| | 2016 | 2017 | 2018 | 2019 |
|---|-----------------------|-----------------------|-----------------------|-----------------------|
| Funded status of accrued benefits | | | | |
| Present value of accrued benefits (PVAB) | \$95,724,505 | \$105,013,194 | \$109,011,087 | \$112,526,975 |
| Market value of assets (MVA) | 116,693,212 | 123,075,151 | 127,424,584 | 128,053,947 |
| Under (over) funded PVAB | \$(20,968,707) | \$(18,061,957) | \$(18,413,497) | \$(15,526,972) |
| Accrued benefit funded percentage | 122% | 117% | 117% | 114% |
| Funded status of present value of projected benefits | | | | |
| Present value of projected benefit (PVPB) | \$139,964,663 | \$157,363,702 | \$130,380,510 | \$135,378,822 |
| Actuarial value of assets | 116,693,212 | 123,075,151 | 127,424,584 | 128,053,947 |
| Unfunded actuarial accrued liability | \$23,271,451 | \$34,288,551 | \$2,955,926 | \$7,324,875 |
| Funded percentage | 83% | 78% | 98% | 95% |
| Normal cost | | | | |
| Total normal cost (NC) | \$2,870,079 | \$3,985,212 | \$4,357,884 | \$5,031,049 |
| Actuarially determined contribution (ADC) | | | | |
| Employer normal cost | \$2,870,079 | \$3,985,212 | \$4,357,884 | \$5,031,049 |
| Amortization of unfunded AAL | 0 | 0 | 0 | 0 |
| Interest | 186,555 | 239,113 | 261,473 | 301,863 |
| Expected Employer ADC | \$3,056,634 | \$4,224,325 | \$4,619,357 | \$5,332,912 |
| Liability interest rate | 6.50% | 6.00% | 6.00% | 6.00% |
| Projected current year compensation | \$139,982,347 | \$146,287,009 | \$150,258,180 | \$157,834,071 |

| | 2013 | 2014 | 2015 |
|--|--------------|--------------|--------------|
| Census at beginning of year | | | |
| Number of active participants | 1982 | 2,041 | 2,012 |
| Number of terminated vested participants | 839 | 871 | 955 |
| Number of disabled participants | 18 | 16 | 15 |
| Number of retirees | 1143 | 1,170 | 1,191 |
| Total participants | 3,982 | 4,098 | 4,173 |
| Plan maturity measures | | | |
| Non-active employees as a percentage of total | 50% | 50% | 52% |
| In pay status PV accrued benefits as a percentage of total | 57% | 58% | 57% |
| Achievement of economic assumptions | | | |
| Expected rate of return | 6.50% | 6.50% | 6.50% |
| Actual market value rate of return | 6.56% | 12.83% | (0.69)% |
| Liability interest rate | 6.50% | 6.50% | 6.50% |

| | 2016 | 2017 | 2018 | 2019 |
|--|--------------|--------------|--------------|--------------|
| Census at beginning of year | | | | |
| Number of active participants | 2,133 | 2,194 | 2,208 | 2,517 |
| Number of terminated vested participants | 985 | 1,074 | 1,347 | 1,600 |
| Number of disabled participants | 16 | 15 | 16 | 16 |
| Number of retirees | 1,224 | 1,253 | 1,261 | 1,270 |
| Total participants | 4,358 | 4,536 | 4,832 | 5,403 |
| Plan maturity measures | | | | |
| Non-active employees as a percentage of total | 51% | 52% | 54% | 53% |
| In pay status PV accrued benefits as a percentage of total | 57% | 55% | 53% | 52% |
| Achievement of economic assumptions | | | | |
| Expected rate of return | 6.50% | 6.00% | 6.00% | 6.00% |
| Actual market value rate of return | 8.95% | 6.88% | 3.60% | -- |
| Liability interest rate | 6.50% | 6.00% | 6.00% | 6.00% |



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