

2013 ACTUARIAL VALUATION

Volunteer Fire Fighters' and Reserve Officers' Relief and Pension Fund



WASHINGTON STATE

OCTOBER 2014



Board for Volunteer Fire Fighters and Reserve Officers

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Office of the State Actuary

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Elizabeth Hyde: Page 4, “Car Fire;” page 6, “Tenino Fire Engine.”



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Volunteer Fire Fighters’ and Reserve Officers’ Relief and Pension Fund Actuarial Valuation Report As of June 30, 2013

Released October 2014

As required under RCW 41.24.320, this report documents the results of the actuarial valuation the Office of the State Actuary (we) performed on the Volunteer Fire Fighters’ and Reserve Officers’ Relief and Pension Fund of Washington.

Our primary purpose for performing this valuation is to determine the pension and relief contribution requirements for the plan as of June 30, 2013, under the funding policy established by the Board for Volunteer Fire Fighters and Reserve Officers. This valuation also provides information on the funding progress and developments in the plan over the past year. We organized this report into the following four sections:

- ❖ Summary of Key Results.
- ❖ Actuarial Exhibits.
- ❖ Participant Data.
- ❖ Appendices.

The **Summary of Key Results** provides a high-level summary of the valuation results. The next two sections of the report provide detailed actuarial asset and liability information and membership data. The **Appendices** summarize the actuarial assumptions and methods, major plan provisions, and supporting information used to perform this valuation.

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We encourage you to submit any questions concerning this report to our regular address or our e-mail address at state.actuary@leg.wa.gov. We also invite you to [visit our website](#) for further information regarding the actuarial funding of the Washington State retirement systems.

Sincerely,

Lisa A. Won, ASA, FCA, MAAA
Senior Actuary

Michael Harbour
Senior Actuarial Analyst

SECTION ONE

SUMMARY OF KEY RESULTS



INTENDED USE

The purpose for performing the Volunteer Fire Fighters’ and Reserve Officers’ (VFF) Relief and Pension Fund Actuarial Valuation is to:

- Develop contribution rates to pre-fund the pension and relief benefits under the funding policy established by the Board for Volunteer Fire Fighters and Reserve Officers (the Board).
- Measure the pension system’s funding progress.
- Compare actual experience with assumptions used.
- Detect significant demographic changes.
- Highlight significant plan, assumption, and method changes.

We do not intend this report to satisfy the accounting requirements under the Governmental Accounting Standards Board rules.

FUNDING POLICY

The Board relies on systematic actuarial funding to finance the on-going cost of the pension and relief plans. Under this financing approach, we reduce the cost of future pension and relief payments by the expected long-term return on invested contributions. The plan’s assets are first allocated to pre-fund the pension benefits. Any assets above the pension plan’s accrued liability are allocated to the relief plan. This is a cost-sharing plan that relies on contributions from employees and employers, while the state contributes 40 percent of the annual Fire Insurance Premium Tax collected. Please refer to the **Appendices** for additional details on the actuarial funding methods.

CONTRIBUTION RATES

We determine the pension and relief contribution rates by performing an actuarial valuation. Consistent with current Board funding policy, we determine the per-person level dollar contribution rate required to pre-fund pension benefits using the Entry Age Normal (EAN) Funding Method. This rate includes the Normal Cost (NC) rate, plus a rate to amortize the Unfunded Actuarial Accrued Liability (UAAL). We determine the per-person level dollar contribution rate required to pre-fund relief benefits using the Aggregate Funding Method.

| Per Person Annual Contributions | | |
|---------------------------------|--------------|--------------|
| Valuation Year | 2012 | 2013 |
| Pension Rate | | |
| Employee | \$30 | \$30 |
| Employer | 30 | 30 |
| State | 57 | 62 |
| Normal Cost Rate | \$117 | \$122 |
| State UAAL Rate | 0 | 11 |
| Total Pension Rate | \$117 | \$134 |
| Relief Rate | | |
| Employer | \$30 | \$30 |
| State | 243 | 369 |
| Total Relief Rate | \$273 | \$399 |
| Operating Expenses | | |
| Administration and Expenses | \$40 | \$37 |

Only members of the pension plan and their employers are charged a set pension rate. Only employers of members are charged a set rate for relief costs. Emergency medical service districts and reserve law enforcement officers’ employers pay the full cost of their benefits. Under current funding policy, the state covers all remaining plan costs through the collection of taxes on fire insurance premiums.

The operating expense rate is not actually collected and is provided for informational purposes only. We determined this rate based on actual annual costs from the prior year.

ACTUARIAL LIABILITIES

| Actuarial Liabilities | | |
|---|---------|---------|
| (Dollars in Millions) | 2012 | 2013 |
| Present Value of Future Benefits | | |
| Pension Benefits | \$175.6 | \$189.1 |
| Relief Benefits | \$24.7 | \$25.2 |
| Pension Plan* | | |
| Entry Age Normal Accrued Liability | \$170.3 | \$183.6 |
| Unfunded Actuarial Accrued Liability | \$0.0 | \$1.1 |
| Valuation Interest Rate | 7.00% | 7.00% |

* We do not calculate an actuarial accrued liability for the relief plan since the relief benefits are paid as they are incurred. Relief benefits are not earned or accrued as a member's service increases.



ASSETS

Consistent with the Board's adopted funding policy, assets are first allocated to the pension benefits. Any assets above the pension's Actuarial Accrued Liability (AAL) are allocated to the relief benefits.

| Assets | | |
|-----------------------------|---------|---------|
| (Dollars in Millions) | 2012 | 2013 |
| Market Value of Assets | \$163.8 | \$177.1 |
| Actuarial Value of Assets | 177.6 | 182.5 |
| Contributions* | 1.0 | 1.1 |
| Disbursements | 11.2 | 12.9 |
| Investment Return | 2.7 | 19.7 |
| Other** | \$5.1 | \$5.4 |
| Rate of Return on Assets*** | 1.6% | 12.0% |

*Includes Employee, Employer, and Relief contributions.

**Includes the Fire Insurance Premium Tax less Administrative Expenses.

***This is the dollar-weighted rate of return on the Market Value of Assets.

FUNDED STATUS

The funded status of the pension plan compares the plan's assets to the earned pension liabilities of its members. We determined this by comparing the Actuarial Value of Assets (AVA) to the EAN accrued pension liabilities calculated using the long-term interest rate assumption.

Based on the current funding policy, any assets above the pension plan AAL are allocated to fund the relief benefits. As a result, the pension plan would remain 100 percent funded when total assets exceed the pension AAL. We do not calculate an AAL for the relief plan since the relief benefits are paid as they are incurred. Relief benefits are not earned or accrued as a member's service increases. As such, a relief funded status is not calculated.

| Pension Funded Status | | |
|--|---------|---------|
| <i>(Dollars in Millions)</i> | 2012 | 2013 |
| a. Entry Age Normal Accrued Liability | \$170.3 | \$183.6 |
| b. Actuarial Value of Assets Allocated to Pensions | 170.3 | 182.5 |
| c. Unfunded Liability (a-b) | \$0.0 | \$1.1 |
| d. Funded Ratio (b/a) | 100% | 99% |

Note: Totals may not agree due to rounding.

PARTICIPANT DATA

Changes in the size and composition of plan membership play a major role in the results of the valuation. We observed the changes to the right in plan membership since last year's valuation.

| Changes in Participant Data | | | |
|---|--------|--------|----------|
| | 2012 | 2013 | Increase |
| Actives | | | |
| Number of Active Members in Relief Plan | 12,631 | 12,290 | (3%) |
| Number of Active Members in Pension Plan | 10,432 | 10,230 | (2%) |
| Percent of Volunteers Covered by Pension Plan | 83% | 83% | 1% |
| Average Age | 41.5 | 41.6 | 0% |
| Average Years of Service | 9.9 | 10.8 | 9% |
| Inactives | | | |
| Number of Retirees/Beneficiaries | 3,971 | 4,117 | 4% |
| Number of Terminated Vested Members | 6,174 | 6,123 | (1%) |
| Number of Survivors (Line of Duty) | 14 | 14 | 0% |
| Number of Members with Permanent Disabilities | 13 | 13 | 0% |

ACTUARIAL GAIN/LOSS

The table below describes the various sources that contribute to the change in contribution rates from one year to the next. For each source, we compare the actual amount experienced by the plan to

the amount we assumed. Any difference will increase or decrease the contribution requirements accordingly. The changes in contribution rates shown in the following table represent a summary of the Pension and Relief contribution rates. The Actuarial Gain/Loss tables in the Actuarial Exhibits section of the report provide further detail.

| Change in Contribution Rates by Source | Pension NC* | Pension UAAL | Relief NC |
|---|-----------------|----------------|-----------------|
| 2012 Contribution Rate | \$116.90 | \$0.00 | \$272.56 |
| Liability (Gains) / Losses | 11.30 | (6.71) | 21.75 |
| Asset (Gains) / Losses | 0.00 | (33.03) | 143.72 |
| PV of Future Service (Gains) / Losses | (15.18) | 0.00 | (35.16) |
| Incremental Changes (Gains) / Losses | 9.30 | 51.06 | (4.04) |
| Other (Gains) / Losses | (0.01) | 0.00 | 0.00 |
| Total Change | \$5.42 | \$11.31 | \$126.27 |
| 2013 Preliminary Contribution Rate | \$122.31 | \$11.31 | \$398.83 |
| Laws of 2014 | 0.00 | 0.00 | 0.00 |
| 2013 Contribution Rate | \$122.31 | \$11.31 | \$398.83 |

**Please see the Methods section of the Appendix for details on the modified version of the EAN cost method used. Non-standard sources of annual gain/loss are produced as a result.*



SIGNIFICANT CHANGES SINCE THE PRIOR VALUATION

The following comments summarize the highlights of changes from the last valuation. Please see the **Actuarial Certification Letter** for additional comments on the 2013 valuation results.

Since the 2012 *Volunteer Fire Fighters' and Reserve Officers' Relief and Pension Fund Actuarial Valuation Report (VAVR)*, the most significant impact to the plan can be attributed to updating the mortality assumptions. In studying all Washington State retirement systems combined as part of the [2007-2012 Demographic Experience Study](#), we observed improvements in mortality rates at a higher pace than we previously assumed. This assumption change resulted in approximately a 4.6 percent increase in liabilities.

The plan also experienced actuarial gains and losses as a result of economic and demographic experience that differed from our long-term assumptions. Actuarial gains will reduce contribution rates; actuarial losses will increase contribution rates. Under a reasonable set of actuarial assumptions and methods, actuarial gains and losses will offset over long-term experience periods.

The rate of investment return on the actuarial value of assets for the plan year was higher than the assumed rate of 7 percent, which decreased contribution rates.

The plan experienced both liability gains and losses. Liabilities increased less than expected due to higher turnover and fewer active duty-related disablements and deaths, which decreased contribution rates. Liabilities increased more than expected due to new entrants and higher than expected medical costs, which increased contribution rates.

The Present Value of Future Service increased more than expected due to new entrants, so the number of years for collecting contributions is larger and this results in an actuarial gain to the system, thus lowering contribution rates.

Detailed gain and loss information by plan can be found in the Actuarial Exhibits section of this report.





SECTION TWO

ACTUARIAL EXHIBITS





Office of the State Actuary

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Actuarial Certification Letter Volunteer Fire Fighters’ and Reserve Officers’ Relief and Pension Fund Actuarial Valuation Report As of June 30, 2013

Released October 2014

We prepared this report for the Board for Volunteer Fire Fighters and Reserve Officers (the Board). This report documents the results of the actuarial valuation we performed on the Volunteer Fire Fighters’ and Reserve Officers’ Pension and Relief Benefits as defined under Chapter 41.24 of the Revised Code of Washington. The primary purpose for performing this valuation is to determine the contribution requirements for the pension and relief plans as of the valuation date June 30, 2013, consistent with the Board’s adopted funding policy. This report should not be used for other purposes. Please replace this report when a more recent report becomes available.

To produce the valuation results summarized in this report, we performed calculations requiring assumptions about future economic and demographic events. As part of the [2009 Actuarial Valuation Report of the Relief Benefits](#), healthcare actuaries from Milliman reviewed the healthcare assumptions and methods we used for the relief plan for reasonableness. We relied on Milliman’s expertise for these assumptions and methods since we are not healthcare actuaries. With Milliman’s assistance, we used the medical trend rates assumption from the [2013 PEBB OPEB Report](#). We developed the demographic assumptions we used for this valuation in the [2001-2006 Demographic Experience Study](#). Several of these assumptions that rely on experience from other Washington State retirement systems were updated for this report consistent with the [2007-2012 Demographic Experience Study](#). We document these assumption changes in this report and plan to study the remaining demographic assumptions before we complete the June 30, 2014, actuarial valuation.

We believe that the assumptions and methods used in the valuation are reasonable and appropriate for the primary purpose stated above. The use of another set of assumptions and methods, however, could also be reasonable and could produce materially different results. Actual results may vary from our expectations.

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The Board adopted the investment rate of return assumption used in this valuation, the amortization policy for the Unfunded Actuarial Accrued Liability, and the asset valuation method. We believe the asset valuation method will reduce the contribution rate volatility produced by the Entry Age Normal (EAN) Actuarial Funding Method when used in combination with the existing asset allocation policy of the Washington State Investment Board (WSIB). The combination of the current asset smoothing method with any other funding method or asset allocation policy may not be appropriate.

The Board established a fund to provide for both pension and relief benefits. The Board adopted the policy to pre-fund the pension benefits using the EAN Actuarial Funding Method. The Board also adopted the policy to pre-fund the relief benefits using the Aggregate Actuarial Funding Method. Unless noted otherwise, we selected all other assumptions and methods used in this valuation.

Under current funding policy, certain plan costs are paid by members, employers, and the state. The contribution rate charged to individual members or employers is not intended to cover the full actuarial costs of the plan. However, annual plan income (including state contributions from fire insurance premium taxes, but excluding investment income), continues to exceed the annual actuarial requirements for the plan.

The Board provided us with member, beneficiary, and relief benefit data. We checked the data for reasonableness as appropriate based on the purpose of the valuation. WSIB and the Office of the State Treasurer provided financial and asset information. An audit of the data and financial information was not performed. We relied on all the information provided as complete and accurate. In our opinion, this information is adequate and substantially complete for purposes of this valuation.

The Board and OSA are actively working together to further improve the quality of the data. We previously recommended the Board implement a new data collection process for the relief benefits. A more detailed reporting of medical expenditures on an individual member basis and collecting additional beneficiary data is important in preparing for future experience studies. We use experience studies to set the assumptions upon which the projected costs of the plan are based. In addition, continued improvement in the quality of the participant data will increase the reliability of future valuation results.

In our opinion, all methods, assumptions, and calculations are reasonable and are in conformity with generally accepted actuarial principles and standards of practice as of the date of this publication.



The undersigned, with actuarial credentials, meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein. While this report is intended to be complete, we are available to offer extra advice and explanations as needed.

Sincerely,

Matthew M. Smith, FCA, EA, MAAA
State Actuary

Lisa A. Won, ASA, FCA, MAAA
Senior Actuary

CONTRIBUTION RATES

We used the Entry Age Normal (EAN) Funding Method to determine the pension contribution rates as a level dollar amount. This method divides the contribution rate into two parts: a Normal Cost (NC) rate and a rate to amortize the Unfunded Actuarial Accrued Liability (UAAL). We used the Aggregate Funding Method to determine the relief contribution rates as a level dollar amount.

The total pension contribution rate, which is the sum of the NC and UAAL pension rates, and the relief contribution rate should be sufficient to fund all projected pension and relief benefits of today’s members. However, this assumes:

- Member contributions, employer contributions, and premium taxes are collected regularly.
- The Legislature does not increase benefits.
- Assumptions prove reasonable.

We do not expect a smooth pattern of future contributions due to the variability of the premium tax on fire insurance policies. The plan receives a portion of the annual premium taxes, which serve as a main revenue source of the system. See the **Actuarial Methods** section of the Appendices for more detail. Additionally, the method for allocating assets between the pension and relief plans could amplify the annual volatility of the relief contribution rate.

| Pension and Relief Plans Required Annual Contributions | | |
|--|-------------------|------------------------|
| | Per Person* | Total |
| | (Dollars in Ones) | (Dollars in Thousands) |
| Pension Benefits | | |
| Entry Age Normal Cost | \$122.31 | \$1,251 |
| Cost of UAAL | 11.31 | 116 |
| Total Pension Rate | \$133.62 | \$1,367 |
| Relief Benefits | | |
| Aggregate Normal Cost | \$398.83 | \$4,902 |
| Total Relief Rate | \$398.83 | \$4,902 |
| Operating Expenses | | |
| Administration and Expenses** | \$36.66 | \$451 |
| Total for Pension, Relief, and Expenses | \$569.10 | \$6,719 |

*The Per Person rate is based on the number of active members in the data.

**Estimated using actual dollars.

Notes: Totals may not agree due to rounding.



Development of Pension Plan Normal Cost*

| <i>(Dollars in Thousands)</i> | Total |
|---|--------------|
| Future Value of Fully Projected Benefits (PVFB) | \$684,181 |
| a. Present Value of Fully Projected Benefits (PVFB) | \$189,055 |
| b. Entry Age Normal Actuarial Accrued Liability (AAL) | \$183,578 |
| c. Present Value of Future Normal Costs (PVFNC) (a - b) | \$5,477 |
| d. Present Value of Future Service (PVFS)** | 44,774 |
| e. Per Person Entry Age Normal Cost (c / d in Dollars) | \$122 |
| f. Number of Active Members in Pension Plan | 10,230 |
| g. Entry Age Normal Cost (e x f) | \$1,251 |

*Please see the Methods section of the Appendix for details on the modified version of the EAN cost method used.

**We calculated the Pension PVFS over all active pension members.

Note: Totals may not agree due to rounding.

Development of Relief Plan Normal Cost

| <i>(Dollars in Thousands)</i> | Total |
|---|--------------|
| Future Value of Fully Projected Benefits (PVFB) | \$75,625 |
| a. Present Value of Fully Projected Benefits (PVFB) | \$25,213 |
| b. Actuarial Value of Assets (AVA)* | \$0 |
| c. Unfunded PVFB (a - b) | \$25,213 |
| d. Present Value of Future Service (PVFS)** | 63,218 |
| e. Per Person Aggregate Normal Cost (c / d in Dollars) | \$399 |
| f. Number of Active Members in Relief Plan | 12,290 |
| g. Aggregate Normal Cost (e x f) | \$4,902 |

*We use the excess assets above those allocated to the pension plan for purposes of calculating an aggregate normal cost rate.

**We calculated the Relief PVFS over all active relief members.

Note: Totals may not agree due to rounding.

Development of Pension Plan UAAL

| <i>(Dollars in Thousands)</i> | Total |
|---|-------------|
| Future Value of Fully Projected Benefits (PVFB) | \$684,181 |
| a. Present Value of Fully Projected Benefits (PVFB) | \$189,055 |
| b. Actuarial Value of Assets (AVA) Allocated to Pensions | \$182,451 |
| c. Unfunded PVFB (a - b) | \$6,604 |
| d. Present Value of Future Normal Costs (PVFNC) | \$5,477 |
| e. Unfunded Actuarial Accrued Liability (UAAL) (c - d) | \$1,127 |
| f. Contribution to Amortize the UAAL (Rolling 15-Year) | \$116 |
| g. Number of Active Members in Pension Plan | 10,230 |
| h. Per Person UAAL Contribution (f / g in Dollars) | \$11 |

Note: Totals may not agree due to rounding.

ACTUARIAL LIABILITIES

| Present Value of Benefits – Pension Plan* | | |
|---|------------------|------------------|
| <i>(Dollars in Thousands)</i> | | |
| Liability Measures | EAN AAL** | Fully Projected |
| Active Members | | |
| Retirement | \$42,922 | \$45,745 |
| Termination | 14,281 | 16,490 |
| Death Benefits | 1,091 | 1,192 |
| Withdrawal | 1,633 | 1,977 |
| Total Actives | \$59,927 | \$65,404 |
| Inactive Members | | |
| Retirees | \$73,723 | \$73,723 |
| Terminated Vested | 43,910 | 43,910 |
| Survivor | 6,019 | 6,019 |
| Total Inactives | \$123,651 | \$123,651 |
| 2013 Total | \$183,578 | \$189,055 |
| 2012 Total | \$170,256 | \$175,566 |

*Includes pension benefits only.

**Entry Age Normal Actuarial Accrued Liability.

Note: Totals may not agree due to rounding.



| Present Value of Benefits - Relief Plan* | |
|--|-----------------|
| <i>(Dollars in Thousands)</i> | |
| Liability Measures | Fully Projected |
| Active Members | |
| Duty Disability | \$3,376 |
| Duty-Related Death | 3,274 |
| Medical and Temporary Disability | 12,635 |
| Total Actives | \$19,285 |
| Inactive Members | |
| Survivor | \$2,984 |
| Disability | 2,944 |
| Total Inactives | \$5,928 |
| 2013 Total | \$25,213 |
| 2012 Total | \$24,724 |

*Includes relief benefits only.

Note: Totals may not agree due to rounding.

Fully Projected Benefit Payments

| VFF - Pension Benefits | | | | | | | | | | | |
|------------------------|--------------|---------------|------|--------------|---------------|------|--------------|---------------|------|------------------|------------------|
| (Dollars in Thousands) | Future Value | Present Value | Year | Future Value | Present Value | Year | Future Value | Present Value | Year | Future Value | Present Value |
| 2013 | \$10,262 | \$9,921 | 2038 | \$14,499 | \$2,583 | 2063 | \$5,789 | \$190 | 2088 | \$415 | \$3 |
| 2014 | 10,718 | 9,683 | 2039 | 14,202 | 2,364 | 2064 | 5,444 | 167 | 2089 | 337 | 2 |
| 2015 | 11,088 | 9,363 | 2040 | 13,909 | 2,164 | 2065 | 5,113 | 147 | 2090 | 270 | 1 |
| 2016 | 11,566 | 9,127 | 2041 | 13,591 | 1,976 | 2066 | 4,795 | 128 | 2091 | 213 | 1 |
| 2017 | 12,038 | 8,878 | 2042 | 13,256 | 1,801 | 2067 | 4,488 | 112 | 2092 | 166 | 1 |
| 2018 | 12,581 | 8,672 | 2043 | 12,904 | 1,639 | 2068 | 4,193 | 98 | 2093 | 127 | 1 |
| 2019 | 13,097 | 8,437 | 2044 | 12,520 | 1,486 | 2069 | 3,909 | 85 | 2094 | 97 | 0 |
| 2020 | 13,604 | 8,190 | 2045 | 12,133 | 1,346 | 2070 | 3,636 | 74 | 2095 | 72 | 0 |
| 2021 | 14,025 | 7,891 | 2046 | 11,734 | 1,216 | 2071 | 3,373 | 64 | 2096 | 53 | 0 |
| 2022 | 14,451 | 7,599 | 2047 | 11,396 | 1,104 | 2072 | 3,120 | 56 | 2097 | 39 | 0 |
| 2023 | 14,831 | 7,288 | 2048 | 11,034 | 999 | 2073 | 2,878 | 48 | 2098 | 28 | 0 |
| 2024 | 15,185 | 6,974 | 2049 | 10,685 | 904 | 2074 | 2,645 | 41 | 2099 | 20 | 0 |
| 2025 | 15,422 | 6,620 | 2050 | 10,310 | 815 | 2075 | 2,422 | 35 | 2100 | 14 | 0 |
| 2026 | 15,623 | 6,267 | 2051 | 9,957 | 736 | 2076 | 2,208 | 30 | 2101 | 10 | 0 |
| 2027 | 15,791 | 5,920 | 2052 | 9,623 | 665 | 2077 | 2,004 | 26 | 2102 | 7 | 0 |
| 2028 | 15,893 | 5,569 | 2053 | 9,300 | 600 | 2078 | 1,810 | 22 | 2103 | 5 | 0 |
| 2029 | 15,958 | 5,226 | 2054 | 8,980 | 542 | 2079 | 1,624 | 18 | 2104 | 3 | 0 |
| 2030 | 15,948 | 4,881 | 2055 | 8,644 | 487 | 2080 | 1,448 | 15 | 2105 | 2 | 0 |
| 2031 | 15,859 | 4,536 | 2056 | 8,323 | 439 | 2081 | 1,282 | 12 | 2106 | 1 | 0 |
| 2032 | 15,737 | 4,207 | 2057 | 8,006 | 394 | 2082 | 1,126 | 10 | 2107 | 1 | 0 |
| 2033 | 15,599 | 3,897 | 2058 | 7,651 | 352 | 2083 | 980 | 8 | 2108 | 1 | 0 |
| 2034 | 15,449 | 3,607 | 2059 | 7,278 | 313 | 2084 | 844 | 7 | 2109 | 0 | 0 |
| 2035 | 15,266 | 3,331 | 2060 | 6,898 | 277 | 2085 | 720 | 5 | 2110 | 0 | 0 |
| 2036 | 15,050 | 3,069 | 2061 | 6,518 | 245 | 2086 | 607 | 4 | 2111 | 0 | 0 |
| 2037 | \$14,799 | \$2,821 | 2062 | \$6,147 | \$216 | 2087 | \$505 | \$3 | 2112 | \$0 | \$0 |
| Total | | | | | | | | | | \$684,181 | \$189,055 |

Fully Projected Benefit Payments

| Fully Projected Benefit Payments | | | | | | | | | | | |
|----------------------------------|-----------------|------------------|------|-----------------|------------------|------|-----------------|------------------|------|-----------------|------------------|
| VFF - Relief Benefits | | | | | | | | | | | |
| (Dollars in Thousands) | Future Value | Present Value | Year | Future Value | Present Value | Year | Future Value | Present Value | Year | Future Value | Present Value |
| 2013 | \$2,318 | \$2,240 | 2038 | \$1,247 | \$222 | 2063 | \$551 | \$18 | 2088 | \$162 | \$1 |
| 2014 | 2,258 | 2,040 | 2039 | 1,218 | 203 | 2064 | 533 | 16 | 2089 | 146 | 1 |
| 2015 | 2,201 | 1,858 | 2040 | 1,189 | 185 | 2065 | 513 | 15 | 2090 | 130 | 1 |
| 2016 | 2,144 | 1,692 | 2041 | 1,160 | 169 | 2066 | 493 | 13 | 2091 | 114 | 1 |
| 2017 | 2,088 | 1,540 | 2042 | 1,131 | 154 | 2067 | 473 | 12 | 2092 | 99 | 0 |
| 2018 | 2,037 | 1,404 | 2043 | 1,102 | 140 | 2068 | 452 | 11 | 2093 | 85 | 0 |
| 2019 | 1,989 | 1,281 | 2044 | 1,071 | 127 | 2069 | 432 | 9 | 2094 | 72 | 0 |
| 2020 | 1,942 | 1,169 | 2045 | 1,040 | 115 | 2070 | 412 | 8 | 2095 | 60 | 0 |
| 2021 | 1,899 | 1,068 | 2046 | 1,007 | 104 | 2071 | 394 | 8 | 2096 | 49 | 0 |
| 2022 | 1,858 | 977 | 2047 | 973 | 94 | 2072 | 377 | 7 | 2097 | 40 | 0 |
| 2023 | 1,814 | 892 | 2048 | 938 | 85 | 2073 | 362 | 6 | 2098 | 32 | 0 |
| 2024 | 1,773 | 814 | 2049 | 902 | 76 | 2074 | 348 | 5 | 2099 | 25 | 0 |
| 2025 | 1,732 | 744 | 2050 | 866 | 69 | 2075 | 335 | 5 | 2100 | 20 | 0 |
| 2026 | 1,692 | 679 | 2051 | 831 | 61 | 2076 | 322 | 4 | 2101 | 15 | 0 |
| 2027 | 1,652 | 619 | 2052 | 796 | 55 | 2077 | 311 | 4 | 2102 | 11 | 0 |
| 2028 | 1,612 | 565 | 2053 | 764 | 49 | 2078 | 299 | 4 | 2103 | 8 | 0 |
| 2029 | 1,572 | 515 | 2054 | 733 | 44 | 2079 | 287 | 3 | 2104 | 6 | 0 |
| 2030 | 1,532 | 469 | 2055 | 706 | 40 | 2080 | 276 | 3 | 2105 | 4 | 0 |
| 2031 | 1,492 | 427 | 2056 | 681 | 36 | 2081 | 263 | 3 | 2106 | 3 | 0 |
| 2032 | 1,453 | 388 | 2057 | 659 | 32 | 2082 | 251 | 2 | 2107 | 2 | 0 |
| 2033 | 1,415 | 353 | 2058 | 639 | 29 | 2083 | 237 | 2 | 2108 | 1 | 0 |
| 2034 | 1,378 | 322 | 2059 | 621 | 27 | 2084 | 223 | 2 | 2109 | 1 | 0 |
| 2035 | 1,343 | 293 | 2060 | 604 | 24 | 2085 | 208 | 2 | 2110 | 0 | 0 |
| 2036 | 1,310 | 267 | 2061 | 586 | 22 | 2086 | 193 | 1 | 2111 | 0 | 0 |
| 2037 | \$1,278 | \$244 | 2062 | \$569 | \$20 | 2087 | \$178 | \$1 | 2112 | \$0 | \$0 |
| Total | | | | | | | | | | \$75,625 | \$25,213 |

ASSETS

| Change in Market Value of Assets | |
|---|------------------|
| <i>(Dollars in Thousands)</i> | |
| Market Value as of June 30, 2012 | \$163,842 |
| Revenue | |
| Member Pension Contributions | \$108 |
| Employer Pension Contributions | 513 |
| Relief Plan Contributions | 475 |
| Investment Earnings Net of Expenses | 19,682 |
| Net Fire Insurance Premium Tax* | 5,438 |
| Total Revenue | \$26,217 |
| Disbursements | |
| Refunds | \$24 |
| Expenses | 82 |
| Disability and Survivor Benefits | 733 |
| Miscellaneous | 0 |
| Medical Benefits | 1,869 |
| Retirement Pensions (monthly and lump sums) | 10,217 |
| Total Disbursements | \$12,925 |
| Market Value as of June 30, 2013 | \$177,134 |

* VFF allocated \$520K to their admin account.

Actual admin costs for the prior year were approximately \$451K.

Note: Totals may not agree due to rounding.

| Calculation of the Actuarial Value of Assets | | | |
|---|------------------|----------------|-----------------|
| Assets as of June 30, 2012 | | | |
| <i>(Dollars in Thousands)</i> | | | |
| a. Market Value of Assets | | | \$163,842 |
| b. Deferred Investment Gains (Losses) | | | (13,778) |
| c. Actuarial Value of Assets (a-b) | | | \$177,620 |
| d. Ratio of Actuarial Value to Market Value (c/a) | | | 108% |
| Assets as of June 30, 2013 | | | |
| <i>(Dollars in Thousands)</i> | | | |
| a. Market Value at 6/30/2013 | | | \$177,134 |
| b. Deferred Gains and (Losses) | | | |
| | Plan Year Ending | Years Deferred | Years Remaining |
| | 6/30/2013 | 5 | 4 |
| | 6/30/2012 | 6 | 4 |
| | 6/30/2011 | 8 | 5 |
| | 6/30/2010 | 4 | 0 |
| | 6/30/2009 | 8 | 3 |
| | 6/30/2008 | 8 | 2 |
| | 12/31/2007 | 8 | 1 |
| | Total Deferral | | (\$5,317) |
| c. Market Value less Deferral (a - b) | | | \$182,451 |
| d. 70% of Market Value of Assets | | | \$123,994 |
| e. 130% of Market Value of Assets | | | \$230,274 |
| f. Actuarial Value of Assets* | | | \$182,451 |
| g. Ratio of Actuarial Value to Market Value (f/a) | | | 103% |

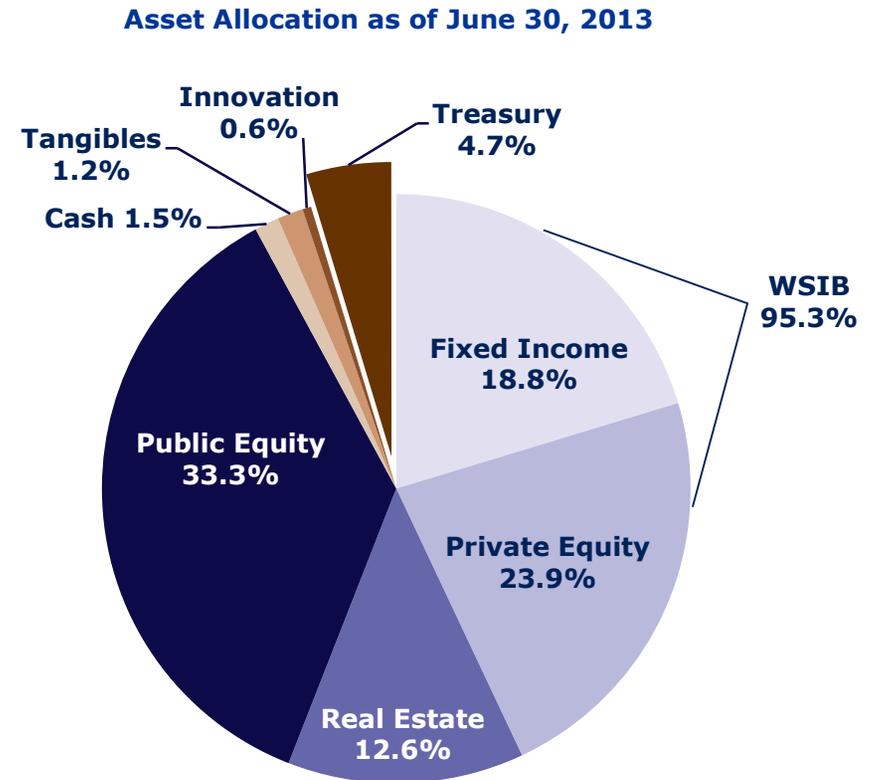
*The actuarial value of assets may not exceed 130% nor drop below 70% of the market value of assets.

Note: Totals may not agree due to rounding.

The Board for Volunteer Fire Fighters and Reserve Officers (the Board) established the plan’s asset fund to pay for both pension and relief benefits. They chose to allocate the assets to pensions up to the Actuarial Accrued Liability (AAL) for the pension plan with any remaining assets allocated to relief benefits. The table below summarizes the allocation of the assets to the pension and relief plans.

| Allocation of Assets by Plan | | | |
|------------------------------|---------|--------|---------|
| (Dollars in Millions) | Pension | Relief | Total |
| Actuarial Value of Assets | \$182.5 | \$0.0 | \$182.5 |

The assumed 7.0 percent investment Rate of Return (ROR) for the plan assets is based upon a weighted average of the expected ROR for the assets in the Treasury and the Washington State Investment Board (WSIB) accounts. On a long-term basis, we expect the Treasury investments to earn 4.0 percent per year and the WSIB investments to earn 7.5 percent per year net of expenses. The distribution of total plan assets between each account fluctuates by year and is monitored by the Board to ensure adequate assets in the Treasury account to make benefit payments. The graph below shows details of the asset allocation for the plan as of June 30, 2013.



WSIB asset allocation for the year ending June 30, 2013, includes assets in the CTF, which comprise 95.3% of the VFF assets. The remaining 4.7% of VFF assets are held in the Treasury and are invested in short-term bonds.

| Annual Income vs. Costs | |
|---------------------------------|----------------|
| <i>(Dollars in Thousands)</i> | |
| Pension and Relief Plans | Total |
| Actuarial Costs | |
| Entry Age Normal Cost | \$1,251 |
| UAAL (Surplus) | 116 |
| Total Pension | 1,367 |
| Relief Aggregate Normal Cost | 4,902 |
| Total Actuarial Costs | \$6,269 |
| Income | |
| State | |
| Fire Insurance Premium Tax | \$5,958 |
| Administration and Expenses | (451) |
| Total State | \$5,508 |
| Pension | |
| Employee | \$300 |
| Employer | 300 |
| Other Pension* | 29 |
| Total Pension | \$629 |
| Relief | |
| Employer** | \$360 |
| Other Relief* | 116 |
| Total Relief | \$476 |
| Total Income | \$6,613 |
| Surplus (Deficit) Income | \$344 |

*Emergency Medical Services Districts and Reserve Law Enforcement Officers pay the full cost of their benefits.

**Relief fees based on the rate of \$30.00 per member.

Note: Totals may not agree due to rounding.

FUNDED STATUS

We report a plan's funded status by comparing the plan's current assets to today's value of the earned pensions of its members. For this valuation report, we present the funded status on an Actuarial Value Basis (AVB). This measure compares the Actuarial Value of Assets (AVA) to the pension plan's EAN liabilities calculated using a long-term interest rate assumption.

The funded status on an AVB assumes the plan is on-going and therefore uses the same long-term assumptions and methods to develop the assets and liabilities as used in determining the contribution requirements of the plan. We do not expect the assumptions to match actual experience over short-term periods. However, we do expect these assumptions to reasonably approximate average annual experience over long-term periods.

We use an asset valuation method to determine the AVA. This asset valuation method smooths the inherent volatility in the Market Value of Assets (MVA) by deferring a portion of annual investment gains or losses for a certain number of years.

Investment gains and losses occur when the annual return on investments varies from the long-term assumed rate of 7 percent. The AVA provides a more stable measure of the plan's assets on an on-going basis.

We use the EAN Actuarial Cost Method to determine the present value of earned pensions (or accrued liability). The accrued liability is based on the difference between the pension's Present Value of Future Benefits and the pension's Present Value of Future Normal Cost. In other words, the accrued liability is the difference between today's value of all projected pension benefits paid by the plan and today's value of the future normal costs required by the pension plan's actuarial funding method. The EAN cost method determines each year's normal cost as a level annual amount that, if collected from each member's entry age to their projected retirement age,

would completely fund their projected pension benefits. The EAN liabilities are discounted to the valuation date using the valuation interest rate to determine the present value (today's value). The valuation interest rate is consistent with the long-term expected return on invested contributions.

The funded status serves as an independent measure to assess the pension system's funding progress and is a consistent measure to compare to the funded statuses of other retirement systems.

Based on the funding policy adopted by the Board, any assets above the pension plan AAL are allocated to fund the relief benefits.

As a result, the funded status of the pension plan would remain 100 percent when total assets exceed the pension plan AAL.

We do not calculate an actuarial accrued liability for the relief plan since the relief benefits are paid as they are incurred. Relief benefits are not earned or accrued as a member's service increases. As such, a funded status is not calculated. Please see the **Development of Relief Plan Normal Cost** for a comparison of the present value of future relief benefits to the assets on hand for (allocated to) relief benefits.

| Pension Funded Status on Actuarial Value Basis | | | |
|---|-----------|--------------------------------|------|
| <i>(Dollars in Thousands)</i> | | | |
| Entry Age Normal Accrued Liability ¹ | \$183,578 | | |
| Actuarial Value of Assets ² | 182,451 | | |
| Unfunded Liability | \$1,127 | | |
| Funded Ratio | | | |
| June 30, 2013 ^{2,4} | 99% | December 31, 2000 ⁴ | 144% |
| June 30, 2012 ² | 100% | December 31, 1999 | 132% |
| June 30, 2011 ² | 100% | December 31, 1998 ³ | 120% |
| June 30, 2010 ² | 100% | December 31, 1997 | 144% |
| June 30, 2009 ³ | 102% | December 31, 1996 | 129% |
| June 30, 2008 | 105% | December 31, 1995 ⁴ | 118% |
| June 30, 2007 ⁴ | 107% | December 31, 1994 | 112% |
| December 31, 2006 | 103% | December 31, 1993 ⁴ | 114% |
| December 31, 2005 ⁴ | 95% | December 31, 1992 | 108% |
| December 31, 2004 | 113% | December 31, 1991 ³ | 103% |
| December 31, 2003 | 116% | December 31, 1990 | 111% |
| December 31, 2002 ³ | 122% | December 31, 1989 ⁴ | 112% |
| December 31, 2001 ⁴ | 142% | December 31, 1988 | 98% |

¹ Prior to 2007 we used the Projected Unit Credit Liability to calculate the funded status.

² Excess assets above Pension AAL are allocated to Relief Benefits.

³ Benefits increased.

⁴ Actuarial assumptions changed.

The present value of actuarial liabilities is sensitive to the interest rate assumption. The table below shows how the funded status changes when we use different interest rate assumptions. We calculated the

liabilities using a 6.25 percent and 7.75 percent ROR to show this sensitivity.

| Pension Funded Status at Variable Interest Rate Assumptions | | | |
|---|-----------|-----------|-----------|
| <i>(Dollars in Thousands)</i> | 6.25% ROR | 7.00% ROR | 7.75% ROR |
| Entry Age Normal Accrued Liability | \$200,977 | \$183,578 | \$168,580 |
| Actuarial Value of Assets ¹ | 182,451 | 182,451 | 168,580 |
| Unfunded Liability | \$18,526 | \$1,127 | \$0 |
| Funded Ratio | | | |
| June 30, 2013 ^{1,3} | 91% | 99% | 100% |
| June 30, 2012 ¹ | 96% | 100% | 100% |
| June 30, 2011 ¹ | 95% | 100% | 100% |
| June 30, 2010 ¹ | 93% | 100% | 100% |
| June 30, 2009 ² | 93% | 102% | 111% |
| June 30, 2008 | 96% | 105% | 115% |
| June 30, 2007 ³ | 98% | 107% | 117% |

¹ Excess assets above Pension AAL are allocated to Relief Benefits.

² Benefits increased.

³ Actuarial assumptions changed.

ECONOMIC EXPERIENCE

The economic experience will reflect the current economic, financial, and inflationary environment. These factors can change more rapidly than the factors affecting our demographic assumptions.

- **Investment Returns** — We assume future investment returns at a rate of 7 percent per year, net of expenses. The investment return assumption represents the average annual rate of return we expect the assets of the plan to earn over the long-term. Actual annual

investment performance over short-term periods will deviate from this long-term assumption. To reduce volatility on contribution rates and reported funded status, the Board adopted an asset smoothing method that limits short-term fluctuation due to the underlying volatility in the MVA. The dollar-weighted annual rate of return was 12 percent on the MVA for the year ending June 30, 2013 (the valuation date).

- **Premium Tax** — As the state’s contribution to the plan, the Office of the State Treasurer allocates 40 percent of the premium tax paid on fire insurance

policies to fund the plan. The level of annual premium tax fluctuates because the amount of the contribution equals the total amount paid by insurers to guarantee associations, which varies from year to year.



| Premium Taxes Contributed to Plan | | | |
|-----------------------------------|-------------------------------|------|---------|
| Year | <i>(Dollars in Thousands)</i> | | |
| 2013 | \$5,958 | 2000 | \$2,869 |
| 2012 | \$5,602 | 1999 | \$2,706 |
| 2011 | \$5,815 | 1998 | \$2,285 |
| 2010 | \$5,685 | 1997 | \$2,539 |
| 2009 | \$5,794 | 1996 | \$2,973 |
| 2008 | \$5,853 | 1995 | \$2,330 |
| 2007 | \$5,689 | 1994 | \$2,370 |
| 2006 | \$5,186 | 1993 | \$2,016 |
| 2005 | \$4,808 | 1992 | \$1,736 |
| 2004 | \$4,726 | 1991 | \$2,081 |
| 2003 | \$4,112 | 1990 | \$1,892 |
| 2002 | \$3,605 | 1989 | \$1,900 |
| 2001 | \$3,320 | | |

DEMOGRAPHIC EXPERIENCE

| Actual vs. Expected Demographic Counts | | | |
|--|--------|----------|---------|
| Counts by Decrement Type | Actual | Expected | Act/Exp |
| New Entrants | 1,683 | N/A | 0.00 |
| Retirements | 91 | 177.4 | 0.51 |
| Terminations | 1,505 | 1,237.4 | 1.22 |
| Active Deaths | 6 | 20.5 | 0.29 |
| Active Disabilities | 1 | 1.3 | 0.79 |
| Inactive Deaths* | 162 | 238.3 | 0.68 |

*Excludes terminated and vested records that cashout or become missing records.

ACTUARIAL GAIN/LOSS

Since the 2012 *Volunteer Fire Fighters' and Reserve Officers' Relief and Pension Fund Actuarial Valuation Report*, the key gains and losses that impacted the results of this valuation include the following.

- The pension and relief normal cost rates experienced liability losses, which increased contribution rates. Primarily, these losses are attributable to new members joining the plan, thus increasing the total liabilities. Additionally, there were higher than expected medical expenses, which contributed to the liability loss for the relief normal cost rate.
- The pension UAAL rate experienced liability gains and losses. Primarily, the gains are attributable to the removal of liability for more active members terminating than expected and fewer terminated members commencing their pensions than expected. Comparatively, the losses are attributable to new members joining the pension plan, members returning to active volunteering, service purchases, and improvements in the data (outlined separately as Data Changes in the Pension UAAL table below).
- The annual investment rate of return on the MVA was 12 percent in 2013. The AVA increased by more than the 7 percent we expected. Overall, this produced an asset gain for the plan which decreased the pension UAAL contribution rate.
- Implementing changes to the mortality assumptions increased plan liabilities by approximately 4.6 percent. This increased the pension accrued liability above the AVA. As a result, the assets allocated to relief benefits decreased to zero, which increased the relief contribution rate significantly. We've separately

identified this as Allocation of Excess Pension Assets in the Relief Normal Cost table below.

- The actual 2013 Present Value of Future Service (PVFS) was higher than we expected. As a result, this gain caused the pension and relief normal cost rates to decrease. The gain in the PVFS is attributable to new members who joined the pension and relief benefit plans.

| Change in Pension Normal Cost Rate by Source* | |
|---|------------------|
| 2012 Pension Normal Cost Rate | \$116.90 |
| Liabilities | |
| Termination | (\$5.10) |
| Retirement | 0.09 |
| Mortality | 0.21 |
| Growth / Return to Work | 17.40 |
| Other Liabilities | (1.29) |
| Total Liabilities (Gains) / Losses | \$11.30 |
| PV of Future Service (Gains) / Losses | (\$15.18) |
| Incremental Changes | |
| Plan Changes | 0.00 |
| Method Changes | (0.06) |
| Assumption Changes | 9.36 |
| Correction Changes | 0.00 |
| Total Incremental Changes (Gains) / Losses | \$9.30 |
| Other (Gains) / Losses | (\$0.01) |
| Total Change | \$5.42 |
| 2013 Preliminary Pension Normal Cost Rate | \$122.31 |
| Laws of 2014 | 0.00 |
| 2013 Pension Normal Cost Rate | \$122.31 |

**Please see the Methods section of the Appendix for details on the modified version of the EAN cost method used. Non-standard sources of annual gain/loss are produced as a result.*

| Change in Pension UAAL Rate by Source | |
|---|------------------|
| 2012 Pension UAAL Rate | \$0.00 |
| Liabilities | |
| Termination | (\$5.55) |
| Retirement | (1.36) |
| Mortality | (9.69) |
| Growth / Return to Work | 8.34 |
| Other Liabilities | 1.54 |
| Total Liabilities (Gains) / Losses | (\$6.71) |
| Assets | |
| Investment Return | (\$10.94) |
| Allocation of Excess Pension Assets* | (22.10) |
| Total Assets (Gains) / Losses | (\$33.03) |
| Incremental Changes | |
| Plan Changes | \$0.00 |
| Method Changes | 0.00 |
| Assumption Changes | 11.31 |
| Data Changes | 39.75 |
| Total Incremental Changes (Gains) / Losses | \$51.06 |
| Other (Gains) / Losses | \$0.00 |
| Total Change | \$11.31 |
| 2013 Preliminary Pension UAAL Rate | \$11.31 |
| Laws of 2014 | 0.00 |
| 2013 Pension UAAL Rate | \$11.31 |

**Based on the funding policy adopted by the Board, assets are allocated to Pension benefits first (up to the pension plan accrued liability), and to Relief second.*

| Change in Relief Normal Cost Rate by Source | |
|---|------------------|
| 2012 Relief Normal Cost Rate | \$272.56 |
| Liabilities | |
| Termination | (\$7.68) |
| Retirement | (0.11) |
| Disability | (9.57) |
| Mortality | (5.15) |
| Growth / Return to Work | 18.70 |
| Other Non-Medical | (0.25) |
| Medical | 25.44 |
| Other Liabilities | 0.37 |
| Total Liabilities (Gains) / Losses | \$21.75 |
| Assets | |
| Investment Return | (\$0.82) |
| Allocation of Excess Pension Assets* | 144.54 |
| Total Assets (Gains) / Losses | \$143.72 |
| PV of Future Service (Gains) / Losses | (\$35.16) |
| Incremental Changes | |
| Plan Changes | \$0.00 |
| Method Changes | (0.42) |
| Assumption Changes | (3.62) |
| Correction Changes | 0.00 |
| Total Incremental Changes (Gains) / Losses | (\$4.04) |
| Other (Gains) / Losses | \$0.00 |
| Total Change | \$126.27 |
| 2013 Preliminary Relief Normal Cost Rate | \$398.83 |
| Laws of 2014 | 0.00 |
| 2013 Relief Normal Cost Rate | \$398.83 |

**Based on the funding policy adopted by the Board, assets are allocated to Pension benefits first (up to the pension plan accrued liability), and to Relief second.*

EFFECT OF PLAN, ASSUMPTION, AND METHOD CHANGES

PLAN CHANGES

- None.

ASSUMPTION CHANGES

- **Mortality Rates** — We updated the mortality assumptions consistent with our analysis on PERS as part of the *2007-2012 Demographic Experience Study*. More specifically, we updated the mortality improvement scale from using 50 percent of Scale AA to 100 percent of Scale BB. This was the most significant change from last year's valuation and comprises nearly all of the impact attributable to these assumption and method changes.
- **Annual Cost-of-Living Adjustment (COLA)** — We lowered the COLA (inflation assumption) from 3.50 percent to 2.75 percent. This assumption change was adopted by the Board as a result of the *Economic Experience Study*. Only the Relief Disability and Line-of-Duty annuities receive a COLA, so there is no impact to the Pension benefits.
- **Ratio of Survivors Selecting Annuities** — We updated this assumption, which values pension plan death benefits for active members and members who terminated service and are entitled to a future retirement benefit. This change is consistent with the changes we made to the PERS 2 assumptions as part of the *2007-2012 Demographic Experience Study*.

- **Joint and Survivor Reduction Factor** — We lowered this assumption, which values pension benefits payable to a surviving spouse if an active member terminates service and dies before commencing their retirement payments; this change included updating the age difference assumption where we now assume a female member has a male spouse that is one year older instead of two. This change is consistent with the changes we made to the PERS 2 assumptions as part of the *2007-2012 Demographic Experience Study*.
- **Percent Married** — We increased this assumption for the active relief duty-related disability and death benefits. This change is consistent with the changes we made to the Law Enforcement Officers' and Fire Fighters' Retirement System Plan 2 assumptions as part of the *2007-2012 Demographic Experience Study*.

METHOD CHANGES

- **Use Actual Gender Codes** — We reviewed the data on genders as reported by the Board and determined they were adequate and reliable for valuation purposes. This is a change from past practice where we relied on the Percent Male assumption for blending all assumptions (e.g. mortality).
- **Termination Rates** — We made small modifications to the termination rates as they apply to the calculation of the PVFS for pensions (see the **Actuarial Methods** section of the Appendices for additional context). These modifications were necessary to accommodate the inclusion of generational mortality improvements.

| Per Person Annual Contribution Rates | | | | |
|--------------------------------------|--------------|-----------------------|-----------------------|--------------|
| Valuation Year | 2012 Final | Data & Asset Changes* | Incremental Changes** | 2013 Final |
| Pension Rate | | | | |
| Employee | \$30 | \$0 | \$0 | \$30 |
| Employer | 30 | 0 | 0 | 30 |
| State | 57 | (4) | 9 | 62 |
| Normal Cost Rate | \$117 | (\$4) | \$9 | \$122 |
| State UAAL or (Surplus) Rate | 0 | 0 | 11 | 11 |
| Total Pension Rate | \$117 | (\$4) | \$21 | \$134 |
| Relief Rate | | | | |
| Employer | \$30 | \$0 | \$0 | \$30 |
| State | 243 | 18 | 108 | 369 |
| Total Relief Rate | \$273 | \$18 | \$108 | \$399 |

**This represents the impact on contribution rates resulting from updated asset values and demographics of the VFF population from the previous valuation date.*

***This represents the impact on contribution rates attributable to plan, assumption, and method changes.*



SECTION THREE

PARTICIPANT DATA



PARTICIPANT DATA

| Membership Data | | | | | |
|---|-------------|-------------|-------------|-------------|-------------|
| Actives | 2009 | 2010 | 2011 | 2012 | 2013 |
| Number of Members in Relief System | 13,418 | 13,327 | 12,982 | 12,631 | 12,290 |
| Average Age | 40.0 | 39.9 | 40.1 | 40.2 | 40.6 |
| Average Total Service | 8.6 | 8.5 | 8.5 | 8.7 | 9.8 |
| Number of Emergency Medical Technicians | 58 | 66 | 67 | 57 | 64 |
| Number of Reserve Law Enforcement Officer | 277 | 274 | 257 | 238 | 228 |
| Number of Active Members Also Receiving a Pension | N/A | N/A | 19 | 37 | 86 |
| Number of Members in Pension System | 10,758 | 10,812 | 10,562 | 10,432 | 10,230 |
| Percent of Volunteers Covered | 80% | 81% | 81% | 83% | 83% |
| Average Age | 41.7 | 41.5 | 41.5 | 41.5 | 41.6 |
| Average Total Service | 10.2 | 9.9 | 9.9 | 9.9 | 10.8 |
| Average Pension Benefit Service | 9.2 | 8.9 | 8.9 | 8.9 | 8.9 |
| Number of Emergency Medical Technicians | 26 | 39 | 36 | 31 | 35 |
| Number of Reserve Law Enforcement Officer | 234 | 239 | 232 | 210 | 203 |
| Retirees | | | | | |
| Number of Retirees/Beneficiaries | 3,612 | 3,712 | 3,836 | 3,971 | 4,117 |
| Average Age | 74.0 | 74.0 | 74.2 | 74.3 | 74.4 |
| Number of New Retirees | 198 | 202 | 207 | 237 | 214 |
| Average Annual Benefit | \$2,161 | \$2,177 | \$2,188 | \$2,198 | \$2,201 |
| Total Annual Benefit Payments | \$7,803,870 | \$8,081,282 | \$8,392,458 | \$8,729,864 | \$9,062,937 |
| Terminated Vested | | | | | |
| Number of Terminated Vested | 6,059 | 6,119 | 6,142 | 6,174 | 6,123 |
| Relief Annuities | | | | | |
| Number of Duty-Death Survivors | 14 | 14 | 14 | 14 | 14 |
| Average Age | 71.2 | 72.2 | 73.1 | 74.1 | 75.2 |
| Average Annual Benefit | \$19,073 | \$19,853 | \$19,853 | \$20,264 | \$20,984 |
| Number of Duty-Related Disabled | 13 | 13 | 13 | 13 | 13 |
| Average Age | 63.3 | 64.2 | 65.2 | 66.2 | 67.2 |
| Average Annual Benefit | \$21,424 | \$22,300 | \$22,300 | \$22,762 | \$23,571 |

| Pension Active Members - Age and Membership Service Distribution | | | | | | | | | | |
|--|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|---------------|
| Membership Service | Attained Age | | | | | | | | | Total |
| | < 25 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60+ | |
| 1 | 410 | 208 | 130 | 96 | 70 | 56 | 33 | 31 | 27 | 1,061 |
| 2 | 339 | 202 | 126 | 98 | 60 | 57 | 32 | 25 | 31 | 970 |
| 3-4 | 448 | 305 | 234 | 197 | 154 | 97 | 65 | 66 | 74 | 1,640 |
| 5-9 | 227 | 421 | 377 | 328 | 293 | 227 | 207 | 133 | 160 | 2,373 |
| 10-14 | 0 | 99 | 218 | 223 | 208 | 200 | 164 | 142 | 180 | 1,434 |
| 15-19 | 0 | 0 | 51 | 134 | 142 | 169 | 153 | 155 | 133 | 937 |
| 20-24 | 0 | 0 | 0 | 46 | 108 | 139 | 173 | 160 | 158 | 784 |
| 25 + | 0 | 0 | 0 | 0 | 19 | 84 | 235 | 319 | 374 | 1,031 |
| Total | 1,424 | 1,235 | 1,136 | 1,122 | 1,054 | 1,029 | 1,062 | 1,031 | 1,137 | 10,230 |

| Relief Active Members - Age and Membership Service Distribution | | | | | | | | | | |
|---|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|---------------|
| Membership Service | Attained Age | | | | | | | | | Total |
| | < 25 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60+ | |
| 1 | 928 | 377 | 261 | 175 | 128 | 93 | 66 | 55 | 66 | 2,149 |
| 2 | 453 | 238 | 148 | 123 | 80 | 69 | 40 | 32 | 45 | 1,228 |
| 3-4 | 521 | 356 | 269 | 214 | 168 | 107 | 74 | 82 | 113 | 1,904 |
| 5-9 | 247 | 470 | 419 | 345 | 316 | 246 | 226 | 148 | 226 | 2,643 |
| 10-14 | 0 | 103 | 223 | 231 | 214 | 206 | 171 | 147 | 204 | 1,499 |
| 15-19 | 0 | 0 | 51 | 134 | 143 | 169 | 154 | 158 | 142 | 951 |
| 20-24 | 0 | 0 | 0 | 46 | 108 | 141 | 177 | 161 | 169 | 802 |
| 25 + | 0 | 0 | 0 | 0 | 19 | 84 | 237 | 322 | 452 | 1,114 |
| Total | 2,149 | 1,544 | 1,371 | 1,268 | 1,176 | 1,115 | 1,145 | 1,105 | 1,417 | 12,290 |

| Pension Retirees* | | | | | |
|-------------------|--------------------|------------------------|-------|--------------------|------------------------|
| Age | Number of Retirees | Average Annual Benefit | Age | Number of Retirees | Average Annual Benefit |
| 60 | 16 | \$1,191 | 76 | 185 | \$2,107 |
| 61 | 10 | \$1,746 | 77 | 156 | \$2,123 |
| 62 | 38 | \$1,782 | 78 | 163 | \$2,097 |
| 63 | 83 | \$1,834 | 79 | 143 | \$2,146 |
| 64 | 75 | \$2,069 | 80 | 119 | \$2,294 |
| 65 | 116 | \$2,230 | 81 | 117 | \$2,180 |
| 66 | 244 | \$2,306 | 82 | 98 | \$2,215 |
| 67 | 234 | \$2,280 | 83 | 114 | \$2,209 |
| 68 | 222 | \$2,351 | 84 | 101 | \$2,275 |
| 69 | 207 | \$2,262 | 85 | 94 | \$2,256 |
| 70 | 217 | \$2,318 | 86 | 84 | \$2,296 |
| 71 | 227 | \$2,262 | 87 | 74 | \$2,215 |
| 72 | 205 | \$2,280 | 88 | 76 | \$2,162 |
| 73 | 172 | \$2,134 | 89 | 43 | \$2,161 |
| 74 | 187 | \$2,254 | 90 + | 109 | \$2,184 |
| 75 | 188 | \$1,988 | Total | 4,117 | \$2,201 |

*Includes beneficiaries of service retirees.

| Line-of-Duty Death Survivors | | | Retirees with Disabilities | | |
|------------------------------|---------------------|------------------------|----------------------------|--------------------|------------------------|
| Age | Number of Survivors | Average Annual Benefit | Age | Number of Retirees | Average Annual Benefit |
| <60 | 4 | \$20,984 | <60 | 4 | \$23,086 |
| 60-74 | 2 | 20,984 | 60-74 | 4 | 24,137 |
| 75-89 | 4 | 20,984 | 75-89 | 5 | 23,506 |
| 90+ | 4 | \$20,984 | 90+ | 0 | \$0 |
| Total | 14 | \$20,984 | Total | 13 | \$23,571 |



SECTION FOUR

APPENDICES



ACTUARIAL ASSUMPTIONS

DECREMENT RATES

| Probability of Disability* | |
|----------------------------|--------|
| Age | Rate |
| 19 | 0.000% |
| 20 | 0.008% |
| 25 | 0.009% |
| 30 | 0.010% |
| 35 | 0.011% |
| 40 | 0.012% |
| 45 | 0.013% |
| 50 | 0.014% |
| 55 | 0.015% |
| 60 | 0.016% |
| 65 | 0.017% |
| 70 | 0.018% |
| 75 | 0.019% |
| 79 | 0.020% |
| 80 | 0.000% |

*The rates are linearly interpolated between the ages.

■ **Disability Rates** — To value disability benefits under the relief plan, we used the duty disability rates developed for the 2009 relief valuation. We assume duty related disability rates increase with age. The older the Volunteer Fire Fighter (VFF) relief member is, the higher the probability of duty-related disability.



■ **Termination Rates** — Termination rates are modeled as a function of Membership Service. Rates increase at 25 years when members reach the maximum pension benefit level.

| Service Years** | Probability of Termination* | | | |
|-----------------|-----------------------------|---------|---------|--------|
| | Ages 15-19 | Age 20 | Age 79 | Age 80 |
| 0-4 | 18.000% | 17.992% | 17.980% | 0.000% |
| 5-9 | 12.000% | 11.992% | 11.980% | 0.000% |
| 10-14 | 9.000% | 8.992% | 8.980% | 0.000% |
| 15-24 | 5.000% | 4.992% | 4.980% | 0.000% |
| 25 | 13.000% | 12.992% | 12.980% | 0.000% |
| 26+ | 9.000% | 8.992% | 8.980% | 0.000% |

*The rates are linearly interpolated between the ages of 20 and 79.

**The service based reduction factors for pension benefits improve at 10, 15, 20, and 25 years of membership service. For calculating the Pension PVFS, we assume 100% termination at 25 years of service.

- **Retirement Rates** — Retirement rates begin at age 60 for active members. We assume that terminated members with vested benefits will defer retirement to age 65.

| Probability of Retirement* | | |
|----------------------------|----------|----------|
| Age** | Rate | |
| | MS < 25 | MS >= 25 |
| 59 | 0.000% | 0.000% |
| 60 | 3.984% | 3.984% |
| 61 | 1.984% | 1.984% |
| 62 | 10.984% | 10.984% |
| 63 | 6.983% | 6.983% |
| 64 | 4.983% | 4.983% |
| 65 | 41.983% | 89.983% |
| 66 | 19.983% | 89.983% |
| 79 | 19.980% | 89.980% |
| 80 | 100.000% | 100.000% |

*For calculating the Pension PVFS, we assume 100% retirement at 25 years of service.

**The rates are linearly interpolated between the ages of 66 and 79.



- Mortality Rates** — We use the Public Employees’ Retirement System (PERS) mortality rates for the VFF plan. The PERS rates are based on the RP-2000 Combined Healthy and RP-2000 Disabled Mortality Tables with generational improvements using 100 percent of Scale BB. The Society of Actuaries

published both the RP-2000 and Scale BB tables. Please see osa.leg.wa.gov for the actuarial valuation report for more details on the development of these tables.

| Base Mortality Rates and Projection Scale | | | | | | | | | |
|---|-----------------|----------|----------------|--------|-----|-----------------|----------|----------------|--------|
| Age | RP-2000 Healthy | | 100% Scale BB* | | Age | RP-2000 Healthy | | 100% Scale BB* | |
| | Male | Female | Male | Female | | Male | Female | Male | Female |
| 19 | 0.000000 | 0.000000 | 0.000 | 0.000 | 42 | 0.001215 | 0.000852 | 0.003 | 0.003 |
| 20 | 0.000345 | 0.000191 | 0.003 | 0.003 | 43 | 0.001299 | 0.000937 | 0.003 | 0.003 |
| 21 | 0.000357 | 0.000192 | 0.003 | 0.003 | 44 | 0.001397 | 0.001029 | 0.003 | 0.003 |
| 22 | 0.000366 | 0.000194 | 0.003 | 0.003 | 45 | 0.001508 | 0.001124 | 0.003 | 0.003 |
| 23 | 0.000373 | 0.000197 | 0.003 | 0.003 | 46 | 0.001616 | 0.001223 | 0.003 | 0.003 |
| 24 | 0.000376 | 0.000201 | 0.003 | 0.003 | 47 | 0.001734 | 0.001326 | 0.003 | 0.003 |
| 25 | 0.000376 | 0.000207 | 0.003 | 0.003 | 48 | 0.001860 | 0.001434 | 0.003 | 0.003 |
| 26 | 0.000378 | 0.000214 | 0.003 | 0.003 | 49 | 0.001995 | 0.001550 | 0.003 | 0.003 |
| 27 | 0.000382 | 0.000223 | 0.003 | 0.003 | 50 | 0.002138 | 0.001676 | 0.003 | 0.003 |
| 28 | 0.000393 | 0.000235 | 0.003 | 0.003 | 51 | 0.002449 | 0.001852 | 0.003 | 0.003 |
| 29 | 0.000412 | 0.000248 | 0.003 | 0.003 | 52 | 0.002667 | 0.002018 | 0.003 | 0.003 |
| 30 | 0.000444 | 0.000264 | 0.003 | 0.003 | 53 | 0.002916 | 0.002207 | 0.003 | 0.003 |
| 31 | 0.000499 | 0.000307 | 0.003 | 0.003 | 54 | 0.003196 | 0.002424 | 0.003 | 0.004 |
| 32 | 0.000562 | 0.000350 | 0.003 | 0.003 | 55 | 0.003624 | 0.002717 | 0.003 | 0.005 |
| 33 | 0.000631 | 0.000394 | 0.003 | 0.003 | 56 | 0.004200 | 0.003090 | 0.003 | 0.006 |
| 34 | 0.000702 | 0.000435 | 0.003 | 0.003 | 57 | 0.004693 | 0.003478 | 0.004 | 0.007 |
| 35 | 0.000773 | 0.000475 | 0.003 | 0.003 | 58 | 0.005273 | 0.003923 | 0.005 | 0.008 |
| 36 | 0.000841 | 0.000514 | 0.003 | 0.003 | 59 | 0.005945 | 0.004441 | 0.006 | 0.009 |
| 37 | 0.000904 | 0.000554 | 0.003 | 0.003 | 60 | 0.006747 | 0.005055 | 0.007 | 0.010 |
| 38 | 0.000964 | 0.000598 | 0.003 | 0.003 | 61 | 0.007676 | 0.005814 | 0.008 | 0.011 |
| 39 | 0.001021 | 0.000648 | 0.003 | 0.003 | 62 | 0.008757 | 0.006657 | 0.009 | 0.012 |
| 40 | 0.001079 | 0.000706 | 0.003 | 0.003 | 63 | 0.010012 | 0.007648 | 0.010 | 0.012 |
| 41 | 0.001142 | 0.000774 | 0.003 | 0.003 | 64 | 0.011280 | 0.008619 | 0.011 | 0.012 |

*Scale BB represents annual improvements in mortality rates.

| Base Mortality Rates and Projection Scale (continued) | | | | | | | | | |
|---|----------|----------------|-------|-----------------|-----|----------------|----------|-------|--------|
| RP-2000 Healthy | | 100% Scale BB* | | RP-2000 Healthy | | 100% Scale BB* | | | |
| Age | Male | Female | Male | Female | Age | Male | Female | Male | Female |
| 65 | 0.012737 | 0.009706 | 0.012 | 0.012 | 88 | 0.150590 | 0.107303 | 0.013 | 0.012 |
| 66 | 0.014409 | 0.010954 | 0.013 | 0.012 | 89 | 0.166420 | 0.119154 | 0.012 | 0.012 |
| 67 | 0.016075 | 0.012163 | 0.014 | 0.012 | 90 | 0.183408 | 0.131682 | 0.011 | 0.011 |
| 68 | 0.017871 | 0.013445 | 0.015 | 0.012 | 91 | 0.199769 | 0.144604 | 0.010 | 0.010 |
| 69 | 0.019802 | 0.014860 | 0.015 | 0.012 | 92 | 0.216605 | 0.157618 | 0.009 | 0.009 |
| 70 | 0.022206 | 0.016742 | 0.015 | 0.012 | 93 | 0.233662 | 0.170433 | 0.008 | 0.008 |
| 71 | 0.024570 | 0.018579 | 0.015 | 0.012 | 94 | 0.250693 | 0.182799 | 0.007 | 0.007 |
| 72 | 0.027281 | 0.020665 | 0.015 | 0.012 | 95 | 0.267491 | 0.194509 | 0.006 | 0.006 |
| 73 | 0.030387 | 0.022970 | 0.015 | 0.012 | 96 | 0.283905 | 0.205379 | 0.005 | 0.005 |
| 74 | 0.033900 | 0.025458 | 0.015 | 0.012 | 97 | 0.299852 | 0.215240 | 0.004 | 0.004 |
| 75 | 0.037834 | 0.028106 | 0.015 | 0.012 | 98 | 0.315296 | 0.223947 | 0.004 | 0.004 |
| 76 | 0.042169 | 0.030966 | 0.015 | 0.012 | 99 | 0.330207 | 0.231387 | 0.003 | 0.003 |
| 77 | 0.046906 | 0.034105 | 0.015 | 0.012 | 100 | 0.344556 | 0.237467 | 0.003 | 0.003 |
| 78 | 0.052123 | 0.037595 | 0.015 | 0.012 | 101 | 0.358628 | 0.244834 | 0.002 | 0.002 |
| 79 | 0.057927 | 0.041506 | 0.015 | 0.012 | 102 | 0.371685 | 0.254498 | 0.002 | 0.002 |
| 80 | 0.064368 | 0.045879 | 0.015 | 0.012 | 103 | 0.383040 | 0.266044 | 0.001 | 0.001 |
| 81 | 0.072041 | 0.050780 | 0.015 | 0.012 | 104 | 0.392003 | 0.279055 | 0.001 | 0.001 |
| 82 | 0.080486 | 0.056294 | 0.015 | 0.012 | 105 | 0.397886 | 0.293116 | 0.000 | 0.000 |
| 83 | 0.089718 | 0.062506 | 0.015 | 0.012 | 106 | 0.400000 | 0.307811 | 0.000 | 0.000 |
| 84 | 0.099779 | 0.069517 | 0.015 | 0.012 | 107 | 0.400000 | 0.322725 | 0.000 | 0.000 |
| 85 | 0.110757 | 0.077446 | 0.015 | 0.012 | 108 | 0.400000 | 0.337441 | 0.000 | 0.000 |
| 86 | 0.122797 | 0.086376 | 0.015 | 0.012 | 109 | 0.400000 | 0.351544 | 0.000 | 0.000 |
| 87 | 0.136043 | 0.096337 | 0.014 | 0.012 | 110 | 1.000000 | 1.000000 | 0.000 | 0.000 |

*Scale BB represents annual improvements in mortality rates.

For display purposes only, we show a unisex mortality table below based upon the percent male assumption described later in this section and applied it to the active and retired member population.

We use the opposite percent male assumption when applying the mortality table to surviving spouses.

| Mortality Projected 15 Years Past the Valuation Date to 2028* | | | | | | | | | | | | | | | |
|---|----------|----------|----------|-----|----------|----------|----------|-----|----------|----------|----------|-----|----------|----------|----------|
| Age | Member | Survivor | Disabled | Age | Member | Survivor | Disabled | Age | Member | Survivor | Disabled | Age | Member | Survivor | Disabled |
| 19 | 0.000303 | 0.000190 | 0.019360 | 42 | 0.001016 | 0.000746 | 0.019360 | 65 | 0.007855 | 0.006337 | 0.034203 | 88 | 0.091750 | 0.071266 | 0.109924 |
| 20 | 0.000303 | 0.000190 | 0.019360 | 43 | 0.001084 | 0.000816 | 0.019360 | 66 | 0.008639 | 0.007113 | 0.034687 | 89 | 0.104310 | 0.079613 | 0.117963 |
| 21 | 0.000303 | 0.000190 | 0.019360 | 44 | 0.001161 | 0.000894 | 0.019360 | 67 | 0.009519 | 0.008002 | 0.035255 | 90 | 0.118628 | 0.090887 | 0.131379 |
| 22 | 0.000313 | 0.000192 | 0.019360 | 45 | 0.001250 | 0.000980 | 0.019360 | 68 | 0.010343 | 0.008859 | 0.035916 | 91 | 0.134518 | 0.103287 | 0.146991 |
| 23 | 0.000320 | 0.000194 | 0.019360 | 46 | 0.001351 | 0.001068 | 0.020483 | 69 | 0.011493 | 0.009801 | 0.037660 | 92 | 0.150809 | 0.116548 | 0.163763 |
| 24 | 0.000327 | 0.000197 | 0.019360 | 47 | 0.001450 | 0.001160 | 0.021611 | 70 | 0.012733 | 0.010835 | 0.039574 | 93 | 0.168269 | 0.130584 | 0.181552 |
| 25 | 0.000330 | 0.000201 | 0.019360 | 48 | 0.001557 | 0.001257 | 0.022745 | 71 | 0.014284 | 0.012200 | 0.041673 | 94 | 0.186747 | 0.145195 | 0.200354 |
| 26 | 0.000330 | 0.000206 | 0.019360 | 49 | 0.001671 | 0.001357 | 0.023885 | 72 | 0.015808 | 0.013534 | 0.043967 | 95 | 0.206081 | 0.160189 | 0.219844 |
| 27 | 0.000333 | 0.000212 | 0.019360 | 50 | 0.001793 | 0.001466 | 0.025034 | 73 | 0.017555 | 0.015051 | 0.046467 | 96 | 0.226122 | 0.175382 | 0.239904 |
| 28 | 0.000336 | 0.000220 | 0.019360 | 51 | 0.001923 | 0.001583 | 0.026190 | 74 | 0.019550 | 0.016734 | 0.049177 | 97 | 0.246748 | 0.190596 | 0.260458 |
| 29 | 0.000347 | 0.000231 | 0.019360 | 52 | 0.002196 | 0.001758 | 0.027351 | 75 | 0.021798 | 0.018561 | 0.052101 | 98 | 0.260458 | 0.199954 | 0.273660 |
| 30 | 0.000364 | 0.000243 | 0.019360 | 53 | 0.002392 | 0.001915 | 0.028517 | 76 | 0.024306 | 0.020518 | 0.055232 | 99 | 0.281458 | 0.214276 | 0.294479 |
| 31 | 0.000392 | 0.000260 | 0.019360 | 54 | 0.002610 | 0.002044 | 0.029642 | 77 | 0.027066 | 0.022638 | 0.058565 | 100 | 0.294479 | 0.221803 | 0.306911 |
| 32 | 0.000441 | 0.000300 | 0.019360 | 55 | 0.002855 | 0.002190 | 0.030762 | 78 | 0.030082 | 0.024963 | 0.062087 | 101 | 0.315648 | 0.234647 | 0.328319 |
| 33 | 0.000498 | 0.000342 | 0.019360 | 56 | 0.003228 | 0.002400 | 0.031878 | 79 | 0.033405 | 0.027545 | 0.065781 | 102 | 0.328319 | 0.242246 | 0.340343 |
| 34 | 0.000558 | 0.000384 | 0.019360 | 57 | 0.003632 | 0.002660 | 0.032122 | 80 | 0.037106 | 0.030435 | 0.069628 | 103 | 0.350022 | 0.258862 | 0.361082 |
| 35 | 0.000621 | 0.000425 | 0.019360 | 58 | 0.003948 | 0.002908 | 0.032339 | 81 | 0.041214 | 0.033664 | 0.073610 | 104 | 0.361082 | 0.270070 | 0.370191 |
| 36 | 0.000684 | 0.000464 | 0.019360 | 59 | 0.004314 | 0.003187 | 0.032537 | 82 | 0.046087 | 0.037312 | 0.077712 | 105 | 0.380708 | 0.290350 | 0.387409 |
| 37 | 0.000743 | 0.000503 | 0.019360 | 60 | 0.004730 | 0.003505 | 0.032730 | 83 | 0.051458 | 0.041404 | 0.081918 | 106 | 0.387409 | 0.303593 | 0.390781 |
| 38 | 0.000799 | 0.000541 | 0.019360 | 61 | 0.005220 | 0.003877 | 0.032929 | 84 | 0.057344 | 0.045996 | 0.086221 | 107 | 0.390781 | 0.317030 | 0.392273 |
| 39 | 0.000852 | 0.000584 | 0.019360 | 62 | 0.005778 | 0.004327 | 0.033146 | 85 | 0.063774 | 0.051155 | 0.090616 | 108 | 0.392273 | 0.330453 | 0.393744 |
| 40 | 0.000905 | 0.000630 | 0.019360 | 63 | 0.006423 | 0.004934 | 0.033446 | 86 | 0.070810 | 0.056963 | 0.095099 | 109 | 0.393744 | 0.343697 | 0.395154 |
| 41 | 0.000958 | 0.000683 | 0.019360 | 64 | 0.007156 | 0.005643 | 0.033794 | 87 | 0.080631 | 0.063715 | 0.102309 | 110 | 1.000000 | 1.000000 | 1.000000 |

*Blended for display purposes using the 90% Male assumption. Utilizes PERS age offset assumption of -1 Male, -1 Female.

PENSION BENEFIT ASSUMPTIONS

| Ratio of Survivors Taking Annuities | |
|-------------------------------------|---------|
| Age | Rate |
| 39 | 0.000% |
| 40 | 2.106% |
| 45 | 13.847% |
| 50 | 25.656% |
| 55 | 37.464% |
| 60 | 49.273% |
| 62+ | 57.296% |

Note: This assumption has been blended based upon our 90% Male assumption for display purposes only.

■ **Purchase of Membership Service Credit** — We assume all eligible members will purchase service credits for each year they did not make past pension contributions. As a result, we value all benefits, except for return of contributions, with eligibility and benefit amounts based on membership service instead of benefit service.

■ **Ratio of Survivors Selecting Annuities** — Upon the death of a terminated vested member, we assume

31 percent of members will have a surviving spouse who elects to receive a pension annuity. This assumption includes both the probability that the member has a spouse and the probability that the spouse elects to receive an annuity, instead of a return of contributions. Upon the death of an active member, we assume this probability increases with age as shown in the table above. These assumptions are consistent with those selected for PERS 2.

■ **Joint and Survivor Reduction Factor** — We assume a reduction factor of 0.785 will be applied to joint and survivor pension annuities. We base this assumption on the assumed age difference between male and female members and their spouses. We assume male members are three years older and female members are one year younger than their spouses, consistent with PERS 2.

RELIEF BENEFIT ASSUMPTIONS

The following assumptions were developed in the 2009 *Actuarial Valuation of the Relief Benefits*, the 2013 *Economic Experience Study*, and the 2007-2012 *Demographic Experience Study* for the plans administered by the Department of Retirement Systems.

- **Annual Cost-of-Living Adjustment (COLA)** — We assume a 2.75 percent annual COLA for applicable annuity-based benefits since they are fully indexed benefits. COLAs provided for the relief benefits are based on the change in the Consumer Price Index (CPI) for Urban Wage Earners and Clerical Workers. COLAs are applied to temporary and permanent disability payments. Additionally, spouses and/or children of permanently disabled VFF relief members and spouses and/or children of VFF relief members killed in the line of duty will receive COLAs on their benefits.
- **Duty-Related Death Rate** — We assume the VFF duty-related death rate is $1/12,000 = 0.0083$ percent. The duty-related death rate is a constant probability, regardless of age.
- **Member Duration on Temporary Disability** — We assume members who receive temporary disability benefits will return to active volunteering within six months. These benefits are included in the total relief costs.
- **Percent Married** — We assume that 64.2 percent of the active population is married, consistent with the Law Enforcement Officers' and Fire Fighters' (LEOFF) Plan 2. We apply this assumption to the duty-related death and disability annuities provided to the spouse of the member.

- **Duration of Spousal Long-Term Disability Annuity** — We assume a spouse receiving the Long-Term Disability beneficiary annuity will be paid for the member’s lifetime. We do not make an assumption for divorce.
- **Duration of Spousal Duty-Related Death Annuity** — We assume a spouse receiving the duty-related death beneficiary annuity will be paid for the spouse’s lifetime. We do not make an assumption for remarriage.
- **Number of Dependent Children** — We assume 0.61 constant over all ages of VFF relief members.
- **Duration of Child Annuity** — We assume the average age of a child receiving a VFF relief annuity is eight years old. As a result, we assume that the child based annuities will be paid for ten years.

- **Annual Medical Inflation** — To estimate future medical costs, we chose to apply the medical inflation assumptions from our 2013 *Other Post-Employment Benefits Actuarial Valuation Report*. Based upon the self-insured nature of the VFF relief plan, we assumed the medical inflation trend is consistent with the 2013 Uniform Medical Plan Non-Medicare rates excluding the provision for excise taxes since we assume they do not apply to this plan.

| Medical Inflation | |
|-------------------|------|
| Valuation Year | Rate |
| 2013 | 7.0% |
| 2014 | 5.8% |
| 2015 - 2016 | 6.1% |
| 2017 | 6.4% |
| 2018 - 2022 | 6.0% |
| 2023 - 2032 | 5.9% |
| 2033 - 2035 | 5.8% |
| 2036 | 5.7% |
| 2037 - 2038 | 5.6% |
| 2039 - 2043 | 5.5% |
| 2044 - 2052 | 5.4% |
| 2053 - 2067 | 5.3% |
| 2068 - 2074 | 5.2% |
| 2075 - 2076 | 5.1% |
| 2077 - 2078 | 5.0% |
| 2079 - 2080 | 4.9% |
| 2081 - 2082 | 4.8% |
| 2083+ | 4.7% |



MISCELLANEOUS ASSUMPTIONS

- **Valuation Interest Rate** — We assumed an annual investment rate of return of 7 percent.
- **Percent Male** — We assume 90 percent male for the entire population consistent with LEOFF 2. We only use this assumption when the gender of a spouse is unknown. Otherwise, we use the gender as reported by the Board for Volunteer Fire Fighters (the Board).

ACTUARIAL METHODS

ASSET VALUATION METHOD

An asset valuation method is generally used to adjust the market value of assets and smooth the effects of short-term volatility. The adjusted assets are called the Actuarial Value of Assets (AVA) or valuation assets. The asset valuation method adopted by the Board, provides up to eight years of smoothing for asset returns and is used in combination with the funding method (Actuarial Cost Method) described below.

| Annual Gain/Loss | | |
|------------------|------------------|--------------------|
| Rate of Return | Smoothing Period | Annual Recognition |
| 14% and up | 8 years | 12.50% |
| 13-14% | 7 years | 14.29% |
| 12-13% | 6 years | 16.67% |
| 11-12% | 5 years | 20.00% |
| 10-11% | 4 years | 25.00% |
| 9-10% | 3 years | 33.33% |
| 8-9% | 2 years | 50.00% |
| 6-8% | 1 year | 100.00% |
| 5-6% | 2 years | 50.00% |
| 4-5% | 3 years | 33.33% |
| 3-4% | 4 years | 25.00% |
| 2-3% | 5 years | 20.00% |
| 1-2% | 6 years | 16.67% |
| 0-1% | 7 years | 14.29% |
| 0% and lower | 8 years | 12.50% |

Note: The actuarial value of assets may not exceed 130% nor drop below 70% of the market value of assets.

We determine the AVA by adjusting the Market Value of Assets (MVA) to reflect the difference between the actual investment return and the expected investment return during each of the last eight years or, if fewer, the completed years since adoption, at the following annual recognition rates per year.

Additionally, to ensure the AVA maintains a reasonable relationship to the MVA, a 30 percent corridor is in place. This means the AVA may not exceed 130 percent nor drop below 70 percent of the MVA in any valuation.

ACTUARIAL COST METHOD

The Entry Age Normal (EAN) Actuarial Cost Method is comprised of two components:

- Normal Cost (NC).
- Unfunded Actuarial Accrued Liability (UAAL).

We develop the pension contribution rate as the sum of the NC and an amount to amortize the UAAL.

We use the EAN Actuarial Cost Method to develop the pension contribution rates. The Pension NC is the level dollar amount, calculated individually, that would fund each member's pension benefits from their date of entry in the plan to their assumed retirement.

The UAAL represents the excess of the Present Value of Future Benefits (PVFB) over the Present Value of Future Normal Costs (PVFNC) and the AVA. In other words, the amount of liabilities that are not covered by the sum of current assets and future contributions.

$$\text{In equation form: UAAL} = \text{PVFB} - \text{PVFNC} - \text{AVA.}$$

Such an excess can arise for numerous reasons. For example:

- Benefits granted for service prior to establishment of the plan.
- Retroactive benefit increases or benefit improvements.
- Changes to actuarial assumptions and methods.
- Actual experience under the plan that varies from the assumptions.

We developed the UAAL contribution rate in this valuation as a level dollar amount, amortized over a rolling 15-year period. That means

we recalculate the UAAL contribution rate each year using a new 15-year period.

We use the Aggregate Funding Method to calculate the relief contribution rates. Compared to the EAN Funding Method, the Aggregate Funding Method does not separately amortize a UAAL. The Relief NC is the level dollar amount that would fund all projected future relief benefits of today's members. The relief plan's NC contribution rate is developed by amortizing the relief's Unfunded PVFB over the Present Value of Future Service (PVFS) of the active relief group. The Unfunded PVFB represents the excess of the PVFB over the AVA allocated to the relief plan.

PRESENT VALUE OF FUTURE SERVICE

The actuarial cost methods utilize the PVFS for all applicable members to calculate the contribution rates. The expected total years of future service depends on when we assume members will leave active service. Our current termination, retirement, disability, and mortality rates reflect our best estimate of the future behavior of relief members.

Currently, the decrement rates extend beyond 25 years of service, which is the maximum number of pension payments members may make. For the purposes of determining the PVFS for pensions, we assume all members leave active service once they reach 25 years of service.

METHODS FOR MEDICAL BENEFITS

Duty-related medical benefits, temporary disability payments, and physical exams are valued using age-based premiums. The estimated "payments" for temporary disability and physical exams are assumed to increase by the 2.75 percent inflation assumption. The medical benefits are assumed to increase by medical inflation. The per-person

cost, as of the valuation date, for each benefit is \$115.92 for medical, \$13.70 for temporary disability, and \$9.97 for physicals. These costs include an adjustment from a mid-year timing to a beginning of year timing to properly model the premium payment within the technical limitation of our valuation software.

OPERATING EXPENSES

We used the actual administration and other miscellaneous expenses incurred last year to determine this year's operating expenses.



SUMMARY OF PLAN PROVISIONS

The following pension and relief benefits are provided to volunteer fire fighters.

- Optional membership in the retirement plan.
- Duty-related medical benefits.
- Temporary duty-related disability benefits.
- Permanent disability benefits for duty-related injuries.
- Death benefits for duty-related injuries.

These benefits are part of two distinct plans authorized by different sections of statute. The following section summarizes the benefits and contributions established under Chapter 41.24 RCW. This section is for reference only and does not detail the rules and regulations upon which the actuarial calculations are made. The dollars represent 2013 payment amounts.

PARTICIPATION

RCW 41.24.010 (8)

- “Participant” means: (a) For purposes of relief, any reserve officer who is or may become eligible for relief under this chapter or any fire fighter or emergency worker; and (b) for purposes of retirement pension, any fire fighter, emergency worker, or reserve officer who is or may become eligible to receive a benefit of any type under the retirement provisions of this chapter, or whose beneficiary may be eligible to receive any such benefit.

CONTRIBUTIONS

- **Pension** — If a member chooses to enroll, he/she contributes \$30 annually and the municipality also contributes \$30. Municipalities may pay the entire contribution for the member. Reserve law enforcement officers and emergency medical technicians are required to pay the full amount adopted annually by the Board. That amount for the 2014 calendar year was \$120.
- **Relief** — VFF members do not make contributions to the relief fund. Municipalities contribute \$30 annually on behalf of each member plus 1.5 percent of the annual salary of paid fire fighters not covered under LEOFF. Employers of reserve law enforcement officers and emergency medical technicians are required to pay the full amount adopted annually by the Board. That amount for the 2014 calendar year was \$185.
- **Fire Insurance Premium Tax** — 40 percent of the net premium taxes on fire insurance policies are paid into the plan.

PENSION BENEFITS

DEATH BENEFITS

RCW 41.24.180

Non-Duty Death — If the member had less than ten years of service, the spouse will receive a refund of member contributions without interest. If the member had ten or more years of service, the spouse may elect an annuity or a refund of member and employer contributions without interest. The annuity is the member’s accrued benefit actuarially adjusted to reflect a 100 percent joint and survivor

pension and further actuarially reduced to reflect the difference in the number of years between the fire fighter’s age at death and age 65.

RETIREMENT PENSIONS

RCW 41.24.170

- Normal retirement is available at age 65 with at least ten years of membership service. Early retirement eligibility begins at age 60 with ten years of service, with the benefit amount reduced 8 percent per year when retirement occurs prior to age 65. In addition, under normal or early retirement, the pension is reduced for service less than 25 years as shown in the table below.
- The monthly pension benefit formula is:

$$(\$50 + \$10 \times \text{Benefit Service}) \times (\text{Membership Service Factor}) \times (\text{Age Factor})$$
- “Benefit Service” is the number of years the member made pension contributions. “Membership Service” is the number of years the member was a member of the relief plan. The maximum monthly pension benefit is \$300. There is no automatic post-retirement COLA applied to the benefit.

MEMBERSHIP SERVICE FACTOR FOR RETIREMENT

| Membership Service Factor | | | | |
|---------------------------|-------|-------|-------|------|
| Membership Service | 10-14 | 15-19 | 20-24 | 25 + |
| Factor | 20% | 35% | 75% | 100% |

AGE FACTOR FOR RETIREMENT

| Age Factor | | | | | | |
|------------|-----|-----|-----|-----|-----|------|
| Age | 60 | 61 | 62 | 63 | 64 | 65 |
| Factor | 60% | 68% | 76% | 84% | 92% | 100% |



ACTUARIALLY EQUIVALENT EARLY RETIREMENT REDUCTION FACTORS

We apply these factors to calculate the annuity benefit paid to survivors of active members who die from a non-duty related cause.

| Actuarially Equivalent ERFs | | | |
|-----------------------------|--------|--------------|--------|
| Member's Age | Factor | Member's Age | Factor |
| <35 | 10% | 50 | 27% |
| 35 | 10% | 51 | 29% |
| 36 | 10% | 52 | 32% |
| 37 | 10% | 53 | 34% |
| 38 | 11% | 54 | 37% |
| 39 | 12% | 55 | 41% |
| 40 | 13% | 56 | 44% |
| 41 | 14% | 57 | 48% |
| 42 | 15% | 58 | 52% |
| 43 | 16% | 59 | 57% |
| 44 | 17% | 60 | 62% |
| 45 | 18% | 61 | 68% |
| 46 | 20% | 62 | 75% |
| 47 | 21% | 63 | 82% |
| 48 | 23% | 64 | 91% |
| 49 | 25% | 65 | 100% |

RETIREMENT OPTIONS

RCW 41.24.172

- The normal payment form of the benefit is a single-life annuity.
- Retirees have the option of selecting a 100 percent joint and survivor pop-up pension. The pension amount is reduced from the amount of the normal payment form to provide an ongoing survivor

benefit. If the member dies first, the reduced pension continues to the spouse for their lifetime. If the spouse dies first, the pension pops up to the amount the member would have received under the single-life payment form.

EMERGENCY MEDICAL SERVICE DISTRICTS

- Chapter 331, Laws of 1993 extended the membership provisions of the pension and relief plans to include Emergency Medical Service District (EMSD) Volunteers. The applicable RCW states the funding of the EMSD volunteers should be consistent with the most recent actuarial valuation.
- The funding of the system includes contributions from the members and their districts at a rate established in statute. The total of these is less than the normal cost. The balance of the normal cost comes from another revenue source, 40 percent of the state's premium tax on fire insurance policies. Since the premium tax is independent of the number of members, the addition of new members lowers the system's funding. To prevent this, the entire normal cost and administration expenses are paid by the EMSDs and their volunteers. Volunteers pay the fixed dollar rate established in statute. The EMSDs pay the fixed dollar rate plus any excess cost.

RESERVE LAW ENFORCEMENT OFFICERS

- Chapter 11, Laws of 1995 extended the membership provisions of the pension plan to include Reserve Law Enforcement Officers. The pension provisions mirror those of the EMSDs.

- Chapter 148, Laws of 1999 extended the membership provisions of the relief plan to include Reserve Law Enforcement Officers. The relief provisions mirror those of the EMSDs.

REFUND OF CONTRIBUTIONS

Upon termination from the pension system, the member may elect to receive a refund of their contributions without interest. If the member chooses this option, he/she then forfeits any earned pension benefits.

BUYING BACK PAST SERVICE

If a member misses a pension contribution payment in any year following enrollment in the plan, they may make the contribution at a later date. Interest is added at a rate of 1 percent per month.

RELIEF BENEFITS

MEDICAL BENEFITS

RCW 41.24.035, 41.24.155, and 41.24.220

The Board will reimburse all duty-related medical charges, including:

- Physician fees, paid according to Labor and Industries' fee schedule.
- Hospital fees (room and care, x-rays, laboratory work, physical therapy).
- Screening physical exams for new entrants (up to \$100 per new member).

- Mileage for extended treatment not available locally to VFF members.
- Vocational rehabilitation and prescriptions.

DISABILITY PAYMENTS

RCW 41.24.150

- **Duty Disability** — Members receive temporary duty disability payments of \$3,570.85 per month for up to six months. If the member is on disability for six consecutive months then the member is considered to be permanently disabled and they receive \$1,785.43 per month, their spouse receives \$357.62, and each dependent child receives \$154.03. Disability benefits are subject to a maximum of \$3,570.85 per month. Spouses will no longer be eligible to receive the beneficiary annuity if they get divorced from the VFF member.
- **Effective July 1, 2001** — Benefits are increased annually in line with the CPI Urban Wage Earners and Clerical Workers (CPI-W – All Cities).
- **Non-Duty Disability** — None.

DEATH BENEFITS

RCW 41.24.160, 41.24.230

- **Survivors** — Surviving spouses of members who die while on active duty shall be paid \$1,785.43 monthly. An additional \$500.00 is paid monthly to each of the member's surviving children while they are under 18 years old.

- **Effective July 1, 2001** — Benefits are increased annually in line with the CPI-W – All Cities.
- **Duty Death** — A lump sum of \$214,000 will be paid to a member’s survivor if the member was killed in the line of duty.
- **Funeral and Burial Expenses** — A lump sum of \$2,000 is paid for members who die while on active duty. A \$500 lump sum is paid at the time of death for members who receive disability benefits.



GLOSSARY

You can also use the OSA online [Glossary](#).

ACTUARIAL ACCRUED LIABILITY (AAL)

Computed differently under different funding methods, the AAL generally represents the portion of the Present Value of Fully Projected Benefits attributable to service credit earned (or accrued) as of the valuation date.

ACTUARIAL GAIN OR LOSS

A pension plan incurs actuarial gains or losses when the actual experience of the pension plan does not exactly match assumptions. For example, an actuarial gain would occur if assets earned 10 percent for a given year since the assumed interest rate in the valuation is 7 percent.

ACTUARIAL VALUE OF ASSETS (AVA)

The value of pension plan investments and other property used by the actuary for the purpose of an actuarial valuation (sometimes referred to as valuation assets). Actuaries often select an asset valuation method that smooths the effects of short-term volatility in the market value of assets.

DOLLAR-WEIGHTED RATE OF RETURN

The internal rate of return. This signifies the rate of return during a period with respect to the beginning balance and cash flows that occur during the period. Dollar-Weighted returns measure the actual impact the pension plan experiences during the period, which includes returns based on the timing of the cash flows during the period.

ENTRY AGE NORMAL (EAN) FUNDING METHOD

The EAN Funding Method is a standard actuarial funding method. The annual cost of benefits under EAN is comprised of two components:

- Normal cost; plus
- Amortization of the unfunded actuarial accrued liability.

The normal cost is determined on an individual basis, from a member's age at plan entry, and is designed to be a level percentage of pay throughout a member's career if all assumptions are realized and benefit provisions remain unchanged.

FUNDED STATUS

The ratio of a plan's actuarial value of assets to the present value of earned pensions at the valuation date.

NORMAL COST

Computed differently under different funding methods, the normal cost generally represents the portion of the cost of projected benefits allocated to the current plan year. The employer normal cost is the total normal cost of the plan reduced by employee contributions.

PRESENT VALUE OF FUTURE BENEFITS (PVFB)

Computed by projecting the total future benefit cash flow from the plan, using actuarial assumptions (such as the probability of death or retirement), and then discounting the cash flow to the valuation date using the valuation interest rate.

TIME-WEIGHTED RATE OF RETURN

The geometric average rate of return. This signifies the rate of return during a period without respect to cash flows that occur during the period. Investment manager performance is typically based on time-weighted returns since they have no control over when the cash flows occur.

UNFUNDED ACTUARIAL ACCRUED LIABILITY (UAAL)

The excess, if any, of the actuarial accrued liability over the actuarial value of assets. In other words, the present value of benefits earned to date not covered by current plan assets.





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