

## II. ACTUARIAL EXHIBITS

| Investment Gains and (Losses) for Prior Year     |              |                |              |                |              |
|--|--------------|----------------|--------------|----------------|--------------|
| (Dollars in Millions)                            | PERS 1       | PERS 2/3*      | TRS 1        | TRS 2/3*       | SERS 2/3*    |
| a. 2018 Market Value**                           | \$7,633      | \$38,640       | \$5,775      | \$13,958       | \$5,408      |
| b. Total Cash Flow                               | (475)        | 238            | (415)        | 289            | 99           |
| c. 2019 Market Value**                           | 7,800        | 42,325         | 5,841        | 15,506         | 5,994        |
| d. Actual Return (c - b - a)                     | <b>\$642</b> | <b>\$3,447</b> | <b>\$481</b> | <b>\$1,260</b> | <b>\$487</b> |
| e. Weighted Asset Amount                         | \$7,393      | \$38,764       | \$5,561      | \$14,099       | \$5,456      |
| f. Expected Return (7.5% x e)                    | 554          | 2,907          | 417          | 1,057          | 409          |
| g. Investment Gain/(Loss) for Prior Year (d - f) | 88           | 540            | 64           | 202            | 78           |
| h. Dollar-Weighted Rate of Return**              | 8.68%        | 8.89%          | 8.65%        | 8.93%          | 8.93%        |

Note: Totals may not agree due to rounding.

\*Excludes defined contribution portion of Plan 3 assets.

\*\*Source: Washington State Investment Board.

| Investment Gains and (Losses) for Prior Year<br>(Continued) |             |              |                |              |                |
|---|-------------|--------------|----------------|--------------|----------------|
| (Dollars in Millions)                                       | PSERS 2     | LEOFF 1      | LEOFF 2        | WSPRS        | Total          |
| a. 2018 Market Value*                                       | \$600       | \$5,902      | \$12,942       | \$1,288      | \$92,145       |
| b. Total Cash Flow  | 59          | (370)        | 64             | (39)         | (550)          |
| c. 2019 Market Value*                                       | 715         | 6,028        | 14,159         | 1,361        | 99,729         |
| d. Actual Return (c - b - a)                                | <b>\$57</b> | <b>\$496</b> | <b>\$1,154</b> | <b>\$111</b> | <b>\$8,135</b> |
| e. Weighted Asset Amount                                    | \$627       | \$5,720      | \$12,974       | \$1,269      | \$91,864       |
| f. Expected Return (7.5% x e)**                             | 47          | 429          | 960            | 95           | 6,877          |
| g. Investment Gain/(Loss) for Prior Year (d - f)            | 10          | 67           | 193            | 16           | 1,258          |
| h. Dollar-Weighted Rate of Return*                          | 9.12%       | 8.67%        | 8.89%          | 8.77%        | 8.86%          |

Note: Totals may not agree due to rounding.

\*Source: Washington State Investment Board.

\*\*The expected return for LEOFF 2 is (7.4% x e).

## FUNDED STATUS

In our actuarial valuation report, we calculate a plan's funded status by comparing the plan's current assets, determined under an asset valuation method, to the actuarial accrued liability of its members, calculated under an actuarial cost method. Funded status can vary significantly from plan to plan, depending on the purpose of the measurement and the assumptions and methods used to determine the funded status.

Based on the purpose of the measurement, actuaries can select from several acceptable actuarial cost methods when measuring a plan's funded status. The cost methods vary in the manner they allocate benefits to past and future time periods. Generally speaking, benefits allocated to past service are considered accrued (or earned). Please see the [Glossary](#) on our website for an explanation of the actuarial cost methods we use in this actuarial valuation.

Consistent with financial reporting under GASB requirements, we report funded status using the EAN actuarial cost method. However, the funded status measures we share in this report may still vary from those presented in the [DRS Comprehensive Annual Financial Report](#). These differences occur because the assumptions and methods applied to determine contribution requirements (under a funding valuation) may not apply for financial reporting under GASB accounting standards (an accounting valuation). Put another way, these measurements are used for distinct purposes, and the results may vary between the two reports.

To determine the present value (today's value) of accrued benefits we discount future benefits to the valuation date using the valuation interest rate. This rate is intended to be consistent with the long-term expected return under the

plan’s funding policy. For all plans, with the exception of LEOFF 2, the valuation interest rate is prescribed by the PFC and is subject to revision by the Legislature. For LEOFF 2, the valuation interest rate is prescribed by the LEOFF 2 Retirement Board. (Note: This discount rate may vary from the rate used for financial reporting under GASB accounting standards.)

In addition to the valuation interest rate, we use the same long-term assumptions to develop the funded status measure in this report that we use to determine the contribution requirements of the plan. We don’t 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. This measure of funded status is consistent with the state’s current funding policy and financing plan for future retirement benefits.

For reporting funded status and calculating contribution requirements, we also use an asset valuation method to determine the AVA. This asset valuation method smooths the inherent volatility in the 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. To determine the 2019 investment gains or losses, we used an investment return assumption of 7.5 percent (7.4 percent for LEOFF 2). The AVA provides a more stable measure of the plan’s assets on an ongoing basis.

With this background in mind, we display the funded status on an “actuarial value” basis for each plan in the following table. For the actuarial value basis, we use the assumed long-term rate of return and AVA consistent with the plan’s funding policy.

It’s also reasonable and acceptable to report funded status using other assumptions and methods. The resulting funded status will change with the use of assumptions and methods that vary from what we present in this

report. Please visit the [Interactive Reports](#) page on our website for funded status measures that vary by interest rate assumptions and asset valuation methods.

Generally speaking, under current funding policy, when a plan is less/more than 100 percent funded, we expect higher/lower contribution requirements in the near term to return the plan to a 100 percent funded status over time. A plan with a funded status above 100 percent will require future contributions if the plan has not yet

| Funded Status on an Actuarial Value Basis* |                |                |                |                |              |
|--|----------------|----------------|----------------|----------------|--------------|
| (Dollars in Millions)                      | PERS           |                | TRS            |                | SERS         |
|  | Plan 1         | Plans 2/3      | Plan 1         | Plans 2/3      | Plan 2/3     |
| <b>Accrued Liability</b>                   | \$11,535       | \$42,600       | \$8,405        | \$16,883       | \$6,474      |
| <b>Valuation Assets</b>                    | \$7,461        | \$40,766       | \$5,558        | \$15,311       | \$5,872      |
| <b>Unfunded Liability</b>                  | <b>\$4,074</b> | <b>\$1,833</b> | <b>\$2,847</b> | <b>\$1,572</b> | <b>\$602</b> |
| Funded Ratio                               |                |                |                |                |              |
| <b>2019</b>                                | <b>65%</b>     | <b>96%</b>     | <b>66%</b>     | <b>91%</b>     | <b>91%</b>   |
| <b>2018</b>                                | 60%            | 91%            | 63%            | 90%            | 89%          |
| <b>2017</b>                                | 57%            | 89%            | 60%            | 91%            | 88%          |
| <b>2016</b>                                | 56%            | 87%            | 61%            | 89%            | 87%          |
| <b>2015</b>                                | 58%            | 88%            | 64%            | 92%            | 89%          |
| <b>2014</b>                                | 61%            | 90%            | 69%            | 94%            | 91%          |

Note: Totals may not agree due to rounding.

\*Liabilities valued using the EAN cost method at an interest rate of 7.5%. All assets have been valued under the actuarial asset method.

| Funded Status on an Actuarial Value Basis* |              |                  |                  |             |                |
|--|--------------|------------------|------------------|-------------|----------------|
| (Dollars in Millions)                      | (Continued)  |                  |                  |             |                |
|  | PSERS        | LEOFF            |                  | WSPRS       | Total          |
|  | Plan 2       | Plan 1           | Plan 2           | Plans 1/2   |                |
| <b>Accrued Liability</b>                   | \$685        | \$4,077          | \$11,992         | \$1,370     | \$104,020      |
| <b>Valuation Assets</b>                    | \$690        | \$5,734          | \$13,294         | \$1,301     | \$95,987       |
| <b>Unfunded Liability</b>                  | <b>(\$6)</b> | <b>(\$1,657)</b> | <b>(\$1,302)</b> | <b>\$70</b> | <b>\$8,033</b> |
| Funded Ratio                               |              |                  |                  |             |                |
| <b>2019</b>                                | <b>101%</b>  | <b>141%</b>      | <b>111%</b>      | <b>95%</b>  | <b>92%</b>     |
| <b>2018</b>                                | 96%          | 135%             | 108%             | 93%         | 89%            |
| <b>2017</b>                                | 95%          | 131%             | 109%             | 92%         | 86%            |
| <b>2016</b>                                | 94%          | 126%             | 105%             | 91%         | 84%            |
| <b>2015</b>                                | 95%          | 125%             | 105%             | 98%         | 86%            |
| <b>2014</b>                                | 96%          | 127%             | 107%             | 100%        | 87%            |

Note: Totals may not agree due to rounding.

\*Liabilities valued using the EAN cost method at an interest rate of 7.5% (7.4% for LEOFF 2). All assets have been valued under the actuarial asset method.

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accumulated sufficient assets to pay both the expected cost of benefits that have been earned today and the expected cost of benefits that will be earned by current members in the future. As of this valuation date, and under the data, assumptions and methods used for this actuarial valuation, only LEOFF 1 has sufficient assets to cease ongoing contributions.

The funded status presented in this report are not sufficient to determine whether a plan has enough assets to terminate or settle the plan obligations.

The funded status depends on numerous assumptions. Two of the most significant assumptions are the mortality rates, which estimate how long we expect members to live, and the interest rate or expected return on plan assets. A key component of the mortality assumption is the rate at which mortality is expected to improve in the future. To show this, we doubled the current mortality improvement assumption, i.e., longer lifespans than our best estimate, and assumed no future improvements, shorter lifespans than our best estimate. The tables below demonstrate how the funded status changes across all retirement systems if we alter these assumptions. Please see our [Commentary on Risk](#) webpage for individual system results.

| Sensitivity of Funded Ratios to Mortality Rates |                          |                         |                              |
|---|--------------------------|-------------------------|------------------------------|
| (Dollars in Millions)                           | No Mortality Improvement | Best Estimate Mortality | Double Mortality Improvement |
| Accrued Liability                               | \$98,162                 | \$104,020               | \$109,934                    |
| Valuation Assets                                | \$95,987                 | \$95,987                | \$95,987                     |
| Unfunded Liability                              | \$2,175                  | \$8,033                 | \$13,947                     |
| Funded Ratio                                    | 98%                      | 92%                     | 87%                          |

| Sensitivity of Funded Ratios to Interest Rates* |                  |                       |                   |
|---|------------------|-----------------------|-------------------|
| (Dollars in Millions)                           | 1% Lower<br>6.5% | Best Estimate<br>7.5% | 1% Higher<br>8.5% |
| Accrued Liability                               | \$117,947        | \$104,020             | \$92,492          |
| Valuation Assets                                | \$95,987         | \$95,987              | \$95,987          |
| Unfunded Liability                              | \$21,960         | \$8,033               | (\$3,495)         |
| Funded Ratio                                    | 81%              | 92%                   | 104%              |

\*Best estimate assumption for LEOFF 2 is 7.4% with sensitivities equal to 6.4%/8.4%.

## ACTUARIAL GAIN/LOSS

The following tables display actuarial gains and losses, expressed as contribution rate changes. Actuaries use gain/loss analysis to compare actual changes to assumed changes from various sources with respect to assets, liabilities, and salaries. We also use this analysis to determine:

- ❖ The accuracy of our valuation model and annual processing.
- ❖ Why contribution rates changed.
- ❖ The reasonableness of the actuarial assumptions.

Actuarial gains will reduce contribution rates; actuarial losses will increase contribution rates. Under a reasonable set of actuarial assumptions, actuarial gains and losses will offset over long-term experience periods. The tables that follow provide more details on the individual contribution rate gains and losses for both the Normal Cost rate and the UAAL rate that employers pay.