November 12, 2014

Board of Trustees
Teacher Retirement System of Texas
1000 Red River Street
Austin, TX 78701

## Subject: GASB 67 Reporting and Disclosure Information

Dear Board of Trustees,
This report provides information required by the Teacher Retirement System of Texas (TRS) in connection with the Governmental Accounting Standards Board (GASB) Statement No. 67 "Financial Reporting for Pension Plans." The information provided herein was prepared for the purpose of assisting TRS to comply with the financial reporting and disclosure requirements of GASB No. 67.

The calculation of the liability associated with the benefits described in this report was performed for the purpose of satisfying the requirements of GASB No. 67 and is not applicable for purposes of funding the plan. A calculation of the plan's liability for other purposes may produce significantly different results. This report may be provided to parties other than TRS only in its entirety and only with the permission of TRS.

The total pension liability, net pension liability, and certain sensitivity information shown in this report are based on an actuarial valuation performed as of August 31, 2014. The total pension liability was determined as of the end of the plan year, August 31, 2014. It is our opinion that the recommended assumptions are internally consistent, reasonable, and comply with the requirements under GASB No. 67.

This report is based upon information, furnished to us by TRS, which include benefit provisions, membership information, and financial data. We did not audit this data and information, but we did apply a number of tests and concluded that it was reasonable and consistent. GRS is not responsible for the accuracy or completeness of the information provided to us by TRS.

The final section of the report titled "Calculation of the Single Discount Rate" is not a required disclosure item for your financial statements. However, it is possible that your auditors will request this information which is why it is included in the report.

Certain tables included in the Required Supplementary Information should include a 10-year history of information. As provided for in GASB No. 67, this historical information is only presented for the years in which the information was measured in conformity with the requirements of GASB No. 67. The historical information in this report will begin with the information presented for the fiscal year ending August 31, 2014.

This report compliments the actuarial valuation report that was provided to TRS and should be considered together as a complete report for the plan year ending August 31, 2014. Please see the actuarial valuation report as August 31, 2014 for additional discussion of the nature of actuarial calculations and more information related to participant data, economic and demographic assumptions, and benefit provisions. The actuarial cost method used to determine the GASB No. 67 net pension liability is the Individual Entry Age Normal method as prescribed in GASB No. 67. In addition, the net pension liability was determined using individual active data records rather than the celled data that is used for the funding valuation.

The projected cash flows from the employer are based on contributions for the most recent five year period, modified on consideration of subsequent events. Changes in statute in the last legislative session and new language in the budget policy memorandum for the upcoming legislative session are indicators that the legislature is committed to an increase in funding levels for the pension funds. Considering the above events, projected employer contributions are based on FY 15 funding levels.

To the best of our knowledge, the information contained with this report is accurate and fairly represents the actuarial position of the Teacher Retirement System of Texas. All calculations have been made in conformity with generally accepted actuarial principles and practices as well as with the Actuarial Standards of Practice issued by the Actuarial Standards Board. Mr. Newton is a member of the American Academy of Actuaries (MAAA) and meets the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

Respectfully submitted,


Lewis Ward
Consultant


Joseph P. Newton, FSA, EA, MAAA Sr. Consultant

## Summary of Population Statistics

The total pension liability described in this report is based on the plan membership as of August 31, 2014:

| Inactive Plan Members or Beneficiaries Currently Receiving Benefits | 363,182 |
| :--- | ---: |
| Inactive Plan Members Entitled to But Not Yet Receiving Benefits | 194,083 |
| Active Plan Members | 857,342 |
| Total Plan Members | $1,414,607$ |

## Measurement of the Net Pension Liability

The net pension liability is measured as the total pension liability, less the amount of the pension plan's fiduciary net position. In actuarial terms, this will be the accrued liability less the market value of assets (not the smoothed actuarial value of assets that is often encountered in actuarial valuations performed to determine the employer's contribution requirement).

A single discount rate of $8.000 \%$ was used to measure the total pension liability. This single discount rate was based on the expected rate of return on pension plan investments of $8.000 \%$. The projection of cash flows used to determine this single discount rate assumed that plan member contributions, the employer contributions, and the state contributions will be made at the rates set by the legislature during the 2013 legislative session (please see the actuarial valuation report for a description of these rates).

Based on these assumptions, the pension plan's fiduciary net position was projected to be available to make all projected future benefit payments of current plan members. Therefore, the long-term expected rate of return on pension plan investments was applied to all periods of projected benefit payments to determine the total pension liability.

Below is a table providing the sensitivity of the net pension liability to changes in the discount rate. In particular, the table presents the plan's net pension liability, if it were calculated using a single discount rate that is 1-percentage-point lower or 1-percentage-point higher than the single discount rate:

## Sensitivity of the Net Pension Liability to the Single Discount Rate Assumption

|  |  |  |
| :---: | :---: | :---: |
|  | Current Single Discount |  |
| $\mathbf{1 \%}$ Decrease | Rate Assumption | $\mathbf{1 \%}$ Increase |
| $\mathbf{7 . 0 0 \%}$ | $\mathbf{8 . 0 0 \%}$ | $\mathbf{9 . 0 0 \%}$ |
| $\$ 47,737,071,723$ | $\$ 26,716,832,801$ | $\$ 10,997,609,140$ |

# Reconciliation of Fiduciary Net Position <br> for Year Ended August 31, 2014 

|  | Year Ending August 31, 2014 |  |
| :---: | :---: | :---: |
| Additions |  |  |
| Contributions |  |  |
| Non-Employer Contributing Entity | \$ | 1,530,623,829 |
| Employer |  | 984,552,391 |
| Employee |  | 2,357,686,000 |
| Other |  | 163,248,236 |
| Total Contributions | \$ | 5,036,110,456 |
| Investment Income |  |  |
| Net Appreciation in Fair Value of Investments | \$ | 16,443,655,756 |
| Interest and Dividends |  | 3,241,027,195 |
| Less Investment Expense |  | $(250,252,917)$ |
| Net Investment Income | \$ | 19,434,430,034 |
| Other | \$ | 4,143,449 |
| Total Additions | \$ | 24,474,683,939 |

## Deductions

Benefit payments, including refunds of employee contributions
Pension Plan Administrative Expense

| \$ | $8,959,242,844$ |
| :---: | ---: |
|  | $41,904,190$ |
|  | $82,437,679$ |
| $\$$ | $9,083,584,713$ |
|  |  |
| $\$$ | $15,391,099,226$ |

## Net Position Restricted for Pensions

Beginning of Year
End of Year

## Total Deductions

Net Increase in Net Position

| $\$$ | $117,388,143,859$ |
| :--- | :--- |
| $\$$ | $132,779,243,085$ |

## Schedules of Required Supplementary Information

Schedule of Changes in the Employers' Net Pension Liability and Related Ratios

| Fiscal year ending August 31, | 2014 |  |
| :---: | :---: | :---: |
| Total Pension Liability |  |  |
| Service Cost | \$ | 4,020,975,701 |
| Interest on the Total Pension Liability | \$ | 11,815,645,198 |
| Benefit Changes | \$ | - |
| Difference between Expected and Actual Experience | \$ | 425,457,945 |
| Assumption Changes | \$ | 2,028,541,342 |
| Benefit Payments | \$ | (8,548,642,525) |
| Refunds | \$ | $(410,600,319)$ |
| Net Change in Total Pension Liability | \$ | 9,331,377,342 |
| Total Pension Liability - Beginning | \$ | 150,164,698,544 |
| Total Pension Liability - Ending (a) | \$ | 159,496,075,886 |
| Plan Fiduciary Net Position |  |  |
| Non-Contributing Entity | \$ | 1,530,623,829 |
| Employer Contributions | \$ | 984,552,391 |
| Employee Contributions | \$ | 2,357,686,000 |
| Pension Plan Net Investment Income | \$ | 19,434,430,034 |
| Benefit Payments | \$ | (8,548,642,525) |
| Refunds | \$ | $(410,600,319)$ |
| Pension Plan Administrative Expense | \$ | $(41,904,190)$ |
| Other | \$ | 84,954,006 |
| Net Change in Plan Fiduciary Net Position | \$ | 15,391,099,226 |
| Plan Fiduciary Net Position - Beginning | \$ | 117,388,143,859 |
| Plan Fiduciary Net Position - Ending (b) | \$ | 132,779,243,085 |
| Net Pension Liability - Ending (a) - (b) |  | 26,716,832,801 |
| Plan Fiduciary Net Position as a Percentage |  |  |
| of Total Pension Liability |  | 83.25 \% |
| Covered Employee Payroll | \$ | 36,654,290,800 |
| Net Pension Liability as a Percentage |  |  |
| of Covered Employee Payroll |  | 72.89 \% |
| Notes to Schedule: |  |  |
| N/A |  |  |

## Schedules of Required Supplementary Information <br> Schedule of the Net Pension Liability (Historical)

## Last 10 Fiscal Years

| FY Ending <br> August 31, |  | Total <br> Pension <br> Liability |  | Plan Net <br> Position |  | Net Pension Liability | Plan Net Position as a \% of Total Pension Liability |  | Covered <br> Payroll | Net Pension Liability as a \% of Covered Payroll |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 2005 |  |  |  |  |  |  |  |  |  |  |
| 2006 |  |  |  |  |  |  |  |  |  |  |
| 2007 |  |  |  |  |  |  |  |  |  |  |
| 2008 |  |  |  |  |  |  |  |  |  |  |
| 2009 |  |  |  |  |  |  |  |  |  |  |
| 2010 |  |  |  |  |  |  |  |  |  |  |
| 2011 |  |  |  |  |  |  |  |  |  |  |
| 2012 |  |  |  |  |  |  |  |  |  |  |
| 2013 | \$ | 150,164,698,544 | \$ | 117,388,143,859 |  | 32,776,554,685 | 78.17\% | \$ | 35,188,983,344 | 93.14\% |
| 2014 |  | 159,496,075,886 |  | 132,779,243,085 |  | 26,716,832,801 | 83.25\% |  | 36,654,290,800 | 72.89\% |

## Schedules of Required Supplementary Information Schedule of Contributions

| FY Ending August 31, | Actuarially <br> Determined <br> Contribution | Contribution |  |  | Actual Contribution |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Actual Contribution | Deficiency (Excess) | Covered <br> Payroll | as a \% of Covered Payroll |
| 2014 | 3,177,927,012 | 2,515,176,220 | 662,750,792 | 36,654,290,800 | 6.86\% |

## Notes to Schedule of Contributions

## Valuation Date:

Notes

Teacher Retirement System of Texas
Actuarially determined contribution rates are calculated as of August 31. Members and employers contribute based on statutorily fixed rates.

Methods and Assumptions Used to Determine Contribution Rates:
Actuarial Cost Method

Amortization Method
Remaining Amortization Period
Asset Valuation Method
Inflation
Salary Increases
Investment Rate of Return
Retirement Age

Mortality

For funding purposes, the Ultimate Entry Age Normal actuarial cost method is used in conjunction with a new entrant profile.
Level Percentage of Payroll, Open
30 years
5 Year smoothed market
3.0\%
$4.25 \%$ to $7.25 \%$ including inflation
8.00\%

Experience-based table of rates that are specific to the type of eligibility condition. Last updated for the 2011 valuation pursuant to an experience study of the period September 1, 2006 through August 31, 2010.
Active Mortaility: 1994 Group Annuity Mortality Table set back 6 years for both males and females. Post-Retirement: Client specific tables multiplied by 80\%.

There were no benefit changes during the year.

## Calculation of the Single Discount Rate

GASB Statement No. 67 includes a specific requirement for the discount rate that is used for the purpose of the measurement of the Total Pension Liability. This rate considers the ability of the fund to meet benefit obligations in the future. To make this determination, employer contributions, employee contributions, benefit payments, expenses and investment returns are projected into the future. The Plan Net Position (assets) in future years can then be determined and compared to its obligation to make benefit payments in those years. As long as assets are projected to be on hand in a future year, the assumed valuation discount rate is used. In years where assets are not projected to be sufficient to meet benefit payments, the use of a municipal bond rate is required, as described in the following paragraph.

The single discount rate (SDR) is equivalent to applying these two rates to the benefits that are projected to be paid during the different time periods. The SDR reflects (1) the long-term expected rate of return on pension plan investments (during the period in which the fiduciary net position is projected to be sufficient to pay benefits) and (2) tax-exempt municipal bond rate based on an index of 20-year general obligation bonds with an average AA credit rating (which is published by the Federal Reserve) as of the measurement date (to the extent that the contributions for use with the long-term expected rate of return are not met).

For the purpose of this valuation, the expected rate of return on pension plan investments is $8.000 \%$; the municipal bond rate is $4.170 \%$; and the resulting single discount rate is $8.000 \%$.

The tables in this section provide background for the development of the single discount rate.
The Projection of Contributions table shows the development of expected contributions in future years. Normal Cost contributions for future hires are not included (nor are their liabilities).

The Projection of Plan Fiduciary Net Position table shows the development of expected asset levels in future years.

The Present Values of Projected Benefit Payments table shows the development of the Single Discount Rate (SDR). It breaks down the benefit payments into present values for funded and unfunded portions and shows the equivalent total at the SDR.

# Single Discount Rate Development <br> Projection of Contributions Beginning September 1, 2014 



| 1 | 38,031,050,391 | \$ | 491,156,998 | \$ | 38,522,207,389 | \$ | 2,433,987,225 | \$ | 2,619,510,102 | \$ | $(19,204,239)$ | \$ | 5,034,293,088 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 2 | 36,674,493,991 | \$ | 3,195,990,657 |  | 39,870,484,648 |  | 2,457,191,097 |  | 3,093,949,609 |  | $(115,375,263)$ |  | 5,435,765,443 |
| 3 | 35,591,179,822 | \$ | 5,674,771,788 |  | 41,265,951,610 |  | 2,562,564,947 |  | 3,202,237,845 |  | $(176,485,403)$ |  | 5,588,317,389 |
| 4 | 34,674,754,776 | \$ | 8,035,505,140 |  | 42,710,259,917 |  | 2,669,956,118 |  | 3,314,316,170 |  | $(209,726,684)$ |  | 5,774,545,604 |
| 5 | 33,841,728,982 | \$ | 10,363,390,032 |  | 44,205,119,014 |  | 2,605,813,132 |  | 3,430,317,235 |  | (270,484,480) |  | 5,765,645,887 |
| 6 | 33,056,195,382 | \$ | 12,696,102,797 |  | 45,752,298,179 |  | 2,545,327,044 |  | 3,550,378,339 |  | $(331,368,283)$ |  | 5,764,337,100 |
| 7 | 32,309,142,110 | \$ | 15,044,486,505 |  | 47,353,628,615 |  | 2,487,803,942 |  | 3,674,641,581 |  | $(392,661,098)$ |  | 5,769,784,425 |
| 8 | 31,573,582,002 | \$ | 17,437,423,615 |  | 49,011,005,617 |  | 2,431,165,814 |  | 3,803,254,036 |  | $(455,116,756)$ |  | 5,779,303,094 |
| 9 | 30,830,105,075 | \$ | 19,896,285,738 |  | 50,726,390,814 |  | 2,373,918,091 |  | 3,936,367,927 |  | $(519,293,058)$ |  | 5,790,992,960 |
| 10 | 30,053,940,779 | \$ | 22,447,873,713 |  | 52,501,814,492 |  | 2,314,153,440 |  | 4,074,140,805 |  | $(585,889,504)$ |  | 5,802,404,741 |
| 11 | 29,225,955,853 | \$ | 25,113,422,147 |  | 54,339,377,999 |  | 2,250,398,601 |  | 4,216,735,733 |  | $(655,460,318)$ |  | 5,811,674,016 |
| 12 | 28,323,741,163 | \$ | 27,917,515,066 |  | 56,241,256,229 |  | 2,180,928,070 |  | 4,364,321,483 |  | $(728,647,143)$ |  | 5,816,602,410 |
| 13 | 27,336,626,437 | \$ | 30,873,073,761 |  | 58,209,700,197 |  | 2,104,920,236 |  | 4,517,072,735 |  | $(805,787,225)$ |  | 5,816,205,746 |
| 14 | 26,270,364,175 | \$ | 33,976,675,529 |  | 60,247,039,704 |  | 2,022,818,041 |  | 4,675,170,281 |  | $(886,791,231)$ |  | 5,811,197,091 |
| 15 | 25,134,515,265 | \$ | 37,221,170,829 |  | 62,355,686,094 |  | 1,935,357,675 |  | 4,838,801,241 |  | $(971,472,559)$ |  | 5,802,686,357 |
| 16 | 23,941,243,311 | \$ | 40,596,891,796 |  | 64,538,135,107 |  | 1,843,475,735 |  | 5,008,159,284 |  | (1,059,578,876) |  | 5,792,056,143 |
| 17 | 22,702,981,627 | \$ | 44,093,988,209 |  | 66,796,969,836 |  | 1,748,129,585 |  | 5,183,444,859 |  | $(1,150,853,092)$ |  | 5,780,721,352 |
| 18 | 21,428,493,717 | \$ | 47,706,370,063 |  | 69,134,863,780 |  | 1,649,994,016 |  | 5,364,865,429 |  | $(1,245,136,259)$ |  | 5,769,723,186 |
| 19 | 20,128,160,673 | \$ | 51,426,423,340 |  | 71,554,584,012 |  | 1,549,868,372 |  | 5,552,635,719 |  | (1,342,229,649) |  | 5,760,274,442 |
| 20 | 18,831,045,725 | \$ | 55,227,948,728 |  | 74,058,994,453 |  | 1,449,990,521 |  | 5,746,977,970 |  | (1,441,449,462) |  | 5,755,519,029 |
| 21 | 17,560,845,797 | \$ | 59,090,213,461 |  | 76,651,059,259 |  | 1,352,185,126 |  | 5,948,122,198 |  | (1,542,254,571) |  | 5,758,052,753 |
| 22 | 16,374,379,533 | \$ | 62,959,466,799 |  | 79,333,846,333 |  | 1,260,827,224 |  | 6,156,306,475 |  | $(1,643,242,083)$ |  | 5,773,891,616 |
| 23 | 15,305,106,945 | \$ | 66,805,424,009 |  | 82,110,530,954 |  | 1,178,493,235 |  | 6,371,777,202 |  | $(1,743,621,567)$ |  | 5,806,648,870 |
| 24 | 14,318,981,762 | \$ | 70,665,417,775 |  | 84,984,399,538 |  | 1,102,561,596 |  | 6,594,789,404 |  | $(1,844,367,404)$ |  | 5,852,983,596 |
| 25 | 13,388,988,463 | \$ | 74,569,865,059 |  | 87,958,853,522 |  | 1,030,952,112 |  | 6,825,607,033 |  | (1,946,273,478) |  | 5,910,285,667 |
| 26 | 12,507,336,276 | \$ | 78,530,077,118 |  | 91,037,413,395 |  | 963,064,893 |  | 7,064,503,279 |  | $(2,049,635,013)$ |  | 5,977,933,159 |
| 27 | 11,653,600,874 | \$ | 82,570,121,989 |  | 94,223,722,864 |  | 897,327,267 |  | 7,311,760,894 |  | $(2,155,080,184)$ |  | 6,054,007,977 |
| 28 | 10,814,613,495 | \$ | 86,706,939,669 |  | 97,521,553,164 |  | 832,725,239 |  | 7,567,672,526 |  | $(2,263,051,125)$ |  | 6,137,346,640 |
| 29 | 9,970,759,048 | \$ | 90,964,048,477 |  | 100,934,807,525 |  | 767,748,447 |  | 7,832,541,064 |  | (2,374,161,665) |  | 6,226,127,846 |
| 30 | 9,112,250,237 | \$ | 95,355,275,551 |  | 104,467,525,788 |  | 701,643,268 |  | 8,106,680,001 |  | (2,488,772,692) |  | 6,319,550,577 |
| 31 | 8,232,091,930 | \$ | 99,891,797,260 |  | 108,123,889,191 |  | 633,871,079 |  | 8,390,413,801 |  | $(2,607,175,908)$ |  | 6,417,108,972 |
| 32 | 7,372,610,611 | \$ | 104,535,614,701 |  | 111,908,225,312 |  | 567,691,017 |  | 8,684,078,284 |  | (2,728,379,544) |  | 6,523,389,757 |
| 33 | 6,549,845,694 | \$ | 109,275,167,504 |  | 115,825,013,198 |  | 504,338,118 |  | 8,988,021,024 |  | $(2,852,081,872)$ |  | 6,640,277,270 |
| 34 | 5,765,148,123 | \$ | 114,113,740,537 |  | 119,878,888,660 |  | 443,916,405 |  | 9,302,601,760 |  | (2,978,368,628) |  | 6,768,149,537 |
| 35 | 5,013,490,932 | \$ | 119,061,158,831 |  | 124,074,649,763 |  | 386,038,802 |  | 9,628,192,822 |  | (3,107,496,245) |  | 6,906,735,379 |
| 36 | 4,274,119,568 | \$ | 124,143,142,936 |  | 128,417,262,505 |  | 329,107,207 |  | 9,965,179,570 |  | $(3,240,136,031)$ |  | 7,054,150,746 |
| 37 | 3,567,042,805 | \$ | 129,344,823,887 |  | 132,911,866,693 |  | 274,662,296 |  | 10,313,960,855 |  | $(3,375,899,903)$ |  | 7,212,723,248 |
| 38 | 2,914,398,322 | \$ | 134,649,383,705 |  | 137,563,782,027 |  | 224,408,671 |  | 10,674,949,485 |  | (3,514,348,915) |  | 7,385,009,241 |
| 39 | 2,338,170,355 | \$ | 140,040,344,042 |  | 142,378,514,398 |  | 180,039,117 |  | 11,048,572,717 |  | $(3,655,052,980)$ |  | 7,573,558,854 |
| 40 | 1,860,467,600 | \$ | 145,501,294,801 |  | 147,361,762,402 |  | 143,256,005 |  | 11,435,272,762 |  | (3,797,583,794) |  | 7,780,944,973 |
| 41 | 1,478,867,774 | \$ | 151,040,556,312 |  | 152,519,424,086 |  | 113,872,819 |  | 11,835,507,309 |  | (3,942,158,520) |  | 8,007,221,608 |
| 42 | 1,167,180,671 | \$ | 156,690,423,258 |  | 157,857,603,929 |  | 89,872,912 |  | 12,249,750,065 |  | $(4,089,620,047)$ |  | 8,250,002,930 |
| 43 | 906,236,312 | \$ | 162,476,383,754 |  | 163,382,620,066 |  | 69,780,196 |  | 12,678,491,317 |  | (4,240,633,616) |  | 8,507,637,897 |
| 44 | 694,638,769 | \$ | 168,406,373,000 |  | 169,101,011,769 |  | 53,487,185 |  | 13,122,238,513 |  | $(4,395,406,335)$ |  | 8,780,319,363 |
| 45 | 518,339,568 | \$ | 174,501,207,612 |  | 175,019,547,180 |  | 39,912,147 |  | 13,581,516,861 |  | (4,554,481,519) |  | 9,066,947,489 |
| 46 | 373,936,599 | \$ | 180,771,294,732 |  | 181,145,231,332 |  | 28,793,118 |  | 14,056,869,951 |  | (4,718,130,793) |  | 9,367,532,276 |
| 47 | 261,651,588 | \$ | 187,223,662,841 |  | 187,485,314,428 |  | 20,147,172 |  | 14,548,860,400 |  | (4,886,537,600) |  | 9,682,469,972 |
| 48 | 173,006,970 | \$ | 193,874,293,463 |  | 194,047,300,433 |  | 13,321,537 |  | 15,058,070,514 |  | (5,060,119,059) |  | 10,011,272,992 |
| 49 | 106,254,631 | \$ | 200,732,701,318 |  | 200,838,955,948 |  | 8,181,607 |  | 15,585,102,982 |  | (5,239,123,504) |  | 10,354,161,085 |
| 50 | 57,623,446 | \$ | 207,810,695,961 |  | 207,868,319,407 |  | 4,437,005 |  | 16,130,581,586 |  | $(5,423,859,165)$ |  | 10,711,159,426 |

## Single Discount Rate Development <br> Projection of Contributions Beginning September 1, 2014 (continued)

|  |  |  |  |  |  |  |  |  |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  |  | Employer Normal <br> Cost Contributions |  |
|  |  |  |  |  |  |  | Employer | Related to Payroll |

## Single Discount Rate Development <br> Projection of Plan Fiduciary Net Position Beginning September 1, 2014

| Year | Projected Beginning Plan Net Position | Projected Total Contributions | Projected Benefit Payments | Projected Administrative Expenses | Projected Investment Earnings at $\mathbf{8 . 0 0 \%}$ | Projected Ending Plan <br> Net Position |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | (a) | (b) | (c) | (d) | (e) | (f)=(a)+(b)-(c)-(d)+(e) |
| 1 | \$ 132,779,243,085 | \$ 5,034,293,088 | \$ 9,291,724,697 | \$ 43,370,837 | \$ 10,453,616,883 | 138,932,057,522 |
| 2 | 138,932,057,522 | 5,435,765,443 | 9,848,820,467 | 40,373,741 | 10,939,854,433 | 145,418,483,191 |
| 3 | 145,418,483,191 | 5,588,317,389 | 10,376,148,598 | 38,149,063 | 11,444,153,111 | 152,036,656,029 |
| 4 | 152,036,656,029 | 5,774,545,604 | 10,914,401,080 | 36,324,944 | 11,959,868,416 | 158,820,344,025 |
| 5 | 158,820,344,025 | 5,765,645,887 | 11,452,977,103 | 34,748,223 | 12,481,147,573 | 165,579,412,160 |
| 6 | 165,579,412,160 | 5,764,337,100 | 11,933,469,047 | 33,334,095 | 13,003,027,225 | 172,379,973,344 |
| 7 | 172,379,973,344 | 5,769,784,425 | 12,504,559,319 | 32,039,971 | 13,524,932,442 | 179,138,090,921 |
| 8 | 179,138,090,921 | 5,779,303,094 | 13,088,629,037 | 30,826,703 | 14,043,089,529 | 185,841,027,804 |
| 9 | 185,841,027,804 | 5,790,992,960 | 13,685,041,157 | 29,659,848 | 14,556,431,318 | 192,473,751,077 |
| 10 | 192,473,751,077 | 5,802,404,741 | 14,303,480,735 | 28,517,343 | 15,063,280,007 | 199,007,437,747 |
| 11 | 199,007,437,747 | 5,811,674,016 | 14,665,985,472 | 27,383,937 | 15,572,161,806 | 205,697,904,161 |
| 12 | 205,697,904,161 | 5,816,602,410 | 15,335,603,124 | 26,224,844 | 16,081,368,509 | 212,234,047,112 |
| 13 | 212,234,047,112 | 5,816,205,746 | 16,028,255,880 | 25,023,351 | 16,577,118,416 | 218,574,092,042 |
| 14 | 218,574,092,042 | 5,811,197,091 | 16,746,326,770 | 23,781,177 | 17,056,003,980 | 224,671,185,167 |
| 15 | 224,671,185,167 | 5,802,686,357 | 17,488,551,365 | 22,510,697 | 17,514,369,561 | 230,477,179,024 |
| 16 | 230,477,179,024 | 5,792,056,143 | 18,242,625,017 | 21,223,435 | 17,948,899,867 | 235,954,286,581 |
| 17 | 235,954,286,581 | 5,780,721,352 | 19,000,011,761 | 19,932,483 | 18,356,961,798 | 241,072,025,487 |
| 18 | 241,072,025,487 | 5,769,723,186 | 19,747,174,400 | 18,644,175 | 18,736,688,435 | 245,812,618,534 |
| 19 | 245,812,618,534 | 5,760,274,442 | 20,479,210,762 | 17,369,629 | 19,086,897,060 | 250,163,209,644 |
| 20 | 250,163,209,644 | 5,755,519,029 | 21,176,823,669 | 16,127,378 | 19,407,438,833 | 254,133,216,460 |
| 21 | 254,133,216,460 | 5,758,052,753 | 21,832,002,531 | 14,935,430 | 19,699,482,554 | 257,743,813,807 |
| 22 | 257,743,813,807 | 5,773,891,616 | 22,406,140,380 | 13,834,174 | 19,966,471,205 | 261,064,202,074 |
| 23 | 261,064,202,074 | 5,806,648,870 | 22,875,298,259 | 12,841,891 | 20,215,020,986 | 264,197,731,780 |
| 24 | 264,197,731,780 | 5,852,983,596 | 23,254,079,624 | 11,933,011 | 20,452,696,976 | 267,237,399,716 |
| 25 | 267,237,399,716 | 5,910,285,667 | 23,562,472,390 | 11,086,284 | 20,686,053,219 | 270,260,179,927 |
| 26 | 270,260,179,927 | 5,977,933,159 | 23,810,148,560 | 10,291,072 | 20,920,844,220 | 273,338,517,674 |
| 27 | 273,338,517,674 | 6,054,007,977 | 24,014,101,287 | 9,530,253 | 21,162,124,374 | 276,531,018,485 |
| 28 | 276,531,018,485 | 6,137,346,640 | 24,187,628,997 | 8,792,639 | 21,414,015,216 | 279,885,958,705 |
| 29 | 279,885,958,705 | 6,226,127,846 | 24,350,000,573 | 8,062,311 | 21,679,552,099 | 283,433,575,766 |
| 30 | 283,433,575,766 | 6,319,550,577 | 24,513,388,864 | 7,332,671 | 21,960,645,305 | 287,193,050,113 |
| 31 | 287,193,050,113 | 6,417,108,972 | 24,683,870,702 | 6,600,275 | 22,258,571,163 | 291,178,259,271 |
| 32 | 291,178,259,271 | 6,523,389,757 | 24,810,566,499 | 5,893,746 | 22,576,614,723 | 295,461,803,506 |
| 33 | 295,461,803,506 | 6,640,277,270 | 24,869,275,366 | 5,222,182 | 22,921,606,984 | 300,149,190,212 |
| 34 | 300,149,190,212 | 6,768,149,537 | 24,862,410,405 | 4,586,099 | 23,301,908,681 | 305,352,251,926 |
| 35 | 305,352,251,926 | 6,906,735,379 | 24,807,387,689 | 3,980,751 | 23,725,772,724 | 311,173,391,588 |
| 36 | 311,173,391,588 | 7,054,150,746 | 24,726,967,213 | 3,392,923 | 24,200,425,068 | 317,697,607,266 |
| 37 | 317,697,607,266 | 7,212,723,248 | 24,594,133,720 | 2,834,429 | 24,733,816,230 | 325,047,178,595 |
| 38 | 325,047,178,595 | 7,385,009,241 | 24,380,962,919 | 2,320,632 | 25,336,923,750 | 333,385,828,035 |
| 39 | 333,385,828,035 | 7,573,558,854 | 24,060,050,508 | 1,865,604 | 26,024,019,998 | 342,921,490,776 |
| 40 | 342,921,490,776 | 7,780,944,973 | 23,604,802,331 | 1,484,385 | 26,812,883,437 | 353,909,032,469 |
| 41 | 353,909,032,469 | 8,007,221,608 | 23,027,404,042 | 1,176,776 | 27,723,427,397 | 366,611,100,656 |
| 42 | 366,611,100,656 | 8,250,002,930 | 22,366,881,948 | 925,069 | 28,775,039,757 | 381,268,336,326 |
| 43 | 381,268,336,326 | 8,507,637,897 | 21,638,532,873 | 714,405 | 29,986,307,507 | 398,123,034,452 |
| 44 | 398,123,034,452 | 8,780,319,363 | 20,840,044,904 | 547,127 | 31,376,712,416 | 417,439,474,200 |
| 45 | 417,439,474,200 | 9,066,947,489 | 19,993,385,914 | 409,767 | 32,966,492,387 | 439,479,118,395 |
| 46 | 439,479,118,395 | 9,367,532,276 | 19,106,251,986 | 298,310 | 34,776,263,076 | 464,516,363,451 |
| 47 | 464,516,363,451 | 9,682,469,972 | 18,180,674,612 | 211,634 | 36,827,912,088 | 492,845,859,266 |
| 48 | 492,845,859,266 | 10,011,272,992 | 17,230,417,044 | 143,285 | 39,144,452,601 | 524,771,024,529 |
| 49 | 524,771,024,529 | 10,354,161,085 | 16,260,479,334 | 91,285 | 41,749,970,654 | 560,614,585,650 |
| 50 | 560,614,585,650 | 10,711,159,426 | 15,278,347,430 | 53,058 | 44,669,991,772 | 600,717,336,360 |

# Projection of Plan Fiduciary Net Position Beginning September 1, 2014 (continued) 

Single Discount Rate Development

| Year | Projected Beginning Plan Net Position | Projected Total Contributions | Projected Benefit Payments | Projected Administrative Expenses | $\begin{gathered} \text { Projected } \\ \text { Investment } \\ \text { Earnings at } 8.50 \% \end{gathered}$ | Projected Ending Plan <br> Net Position |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | (a) | (b) | (c) | (d) | (e) | (f)=(a)+(b)-(c)-(d)+(e) |
| 51 | 600,717,336,360 | 11,082,590,200 | 14,198,664,639 | 27,267 | 47,935,140,729 | 645,536,375,383 |
| 52 | 645,536,375,383 | 11,468,738,578 | 13,217,808,746 | 12,883 | 51,574,292,655 | 695,361,584,987 |
| 53 | 695,361,584,987 | 11,869,526,210 | 12,242,454,213 | 6,414 | 55,614,296,401 | 750,602,946,972 |
| 54 | 750,602,946,972 | 12,284,714,380 | 11,284,154,670 | 3,128 | 60,087,488,077 | 811,690,991,631 |
| 55 | 811,690,991,631 | 12,714,525,461 | 10,349,643,431 | 970 | 65,028,054,760 | 879,083,927,452 |
| 56 | 879,083,927,452 | 13,159,487,746 | 9,442,472,738 | 371 | 70,472,534,481 | 953,273,476,570 |
| 57 | 953,273,476,570 | 13,620,044,197 | 8,567,281,126 | 136 | 76,460,100,464 | 1,034,786,339,969 |
| 58 | 1,034,786,339,969 | 14,096,728,397 | 7,727,802,027 | - | 83,032,763,265 | 1,124,188,029,604 |
| 59 | 1,124,188,029,604 | 14,590,113,891 | 6,927,418,420 | - | 90,235,653,625 | 1,222,086,378,700 |
| 60 | 1,222,086,378,700 | 15,100,767,877 | 6,169,587,069 | - | 98,117,284,847 | 1,329,134,844,355 |
| 61 | 1,329,134,844,355 | 15,629,294,753 | 5,457,210,019 | - | 106,729,843,361 | 1,446,036,772,450 |
| 62 | 1,446,036,772,450 | 16,176,320,069 | 4,792,745,272 | - | 116,129,524,951 | 1,573,549,872,197 |
| 63 | 1,573,549,872,197 | 16,742,491,271 | 4,178,135,861 | - | 126,376,895,526 | 1,712,491,123,134 |
| 64 | 1,712,491,123,134 | 17,328,478,466 | 3,614,631,884 | - | 137,537,290,697 | 1,863,742,260,413 |
| 65 | 1,863,742,260,413 | 17,934,975,212 | 3,102,745,834 | - | 149,681,256,378 | 2,028,255,746,170 |
| 66 | 2,028,255,746,170 | 18,562,699,344 | 2,642,232,234 | - | 162,885,027,332 | 2,207,061,240,613 |
| 67 | 2,207,061,240,613 | 19,212,393,821 | 2,232,095,700 | - | 177,231,044,572 | 2,401,272,583,306 |
| 68 | 2,401,272,583,306 | 19,884,827,605 | 1,870,587,115 | - | 192,808,514,048 | 2,612,095,337,844 |
| 69 | 2,612,095,337,844 | 20,580,796,572 | 1,555,189,807 | - | 209,714,010,800 | 2,840,834,955,409 |
| 70 | 2,840,834,955,409 | 21,301,124,452 | 1,282,707,774 | - | 228,052,128,619 | 3,088,905,500,705 |
| 71 | 3,088,905,500,705 | 22,046,663,807 | 1,049,505,472 | - | 247,936,168,752 | 3,357,838,827,792 |
| 72 | 3,357,838,827,792 | 22,818,297,040 | 851,769,194 | - | 269,488,863,754 | 3,649,294,219,393 |
| 73 | 3,649,294,219,393 | 23,616,937,437 | 685,640,275 | - | 292,843,143,450 | 3,965,068,660,005 |
| 74 | 3,965,068,660,005 | 24,443,530,248 | 547,337,007 | - | 318,142,952,040 | 4,307,107,805,286 |
| 75 | 4,307,107,805,286 | 25,299,053,806 | 433,234,208 | - | 345,544,122,574 | 4,677,517,747,459 |
| 76 | 4,677,517,747,459 | 26,184,520,689 | 339,949,360 | - | 375,215,314,853 | 5,078,577,633,640 |
| 77 | 5,078,577,633,640 | 27,100,978,913 | 264,376,515 | - | 407,339,023,607 | 5,512,753,259,644 |
| 78 | 5,512,753,259,644 | 28,049,513,176 | 203,720,857 | - | 442,112,664,697 | 5,982,711,716,660 |
| 79 | 5,982,711,716,660 | 29,031,246,137 | 155,481,456 | - | 479,749,747,573 | 6,491,337,228,914 |
| 80 | 6,491,337,228,914 | 30,047,339,752 | 117,465,261 | - | 520,481,141,792 | 7,041,748,245,197 |
| 81 | 7,041,748,245,197 | 31,098,996,642 | 87,792,619 | - | 564,556,444,176 | 7,637,315,893,396 |
| 82 | 7,637,315,893,396 | 32,187,461,525 | 64,880,460 | - | 612,245,455,892 | 8,281,683,930,353 |
| 83 | 8,281,683,930,353 | 33,314,022,678 | 47,390,725 | - | 663,839,780,519 | 8,978,790,342,825 |
| 84 | 8,978,790,342,825 | 34,480,013,472 | 34,203,105 | - | 719,654,553,257 | 9,732,890,706,449 |
| 85 | 9,732,890,706,449 | 35,686,813,944 | 24,386,557 | - | 780,030,310,822 | 10,548,583,444,658 |
| 86 | 10,548,583,444,658 | 36,935,852,432 | 17,175,607 | - | 845,335,013,153 | 11,430,837,134,635 |
| 87 | 11,430,837,134,635 | 38,228,607,267 | 11,944,575 | - | 915,966,228,966 | 12,385,020,026,293 |
| 88 | 12,385,020,026,293 | 39,566,608,521 | 8,203,168 | - | 992,353,497,513 | 13,416,931,929,159 |
| 89 | 13,416,931,929,159 | 40,951,439,819 | 5,557,922 | - | 1,074,960,881,120 | 14,532,838,692,176 |
| 90 | 14,532,838,692,176 | 42,384,740,213 | 3,710,941 | - | 1,164,289,723,688 | 15,739,509,445,136 |
| 91 | 15,739,509,445,136 | 43,868,206,121 | 2,431,565 | - | 1,260,881,631,201 | 17,044,256,850,893 |
| 92 | 17,044,256,850,893 | 45,403,593,334 | 1,558,429 | - | 1,365,321,691,900 | 18,454,980,577,698 |
| 93 | 18,454,980,577,698 | 46,992,719,101 | 972,732 | - | 1,478,241,955,195 | 19,980,214,279,263 |
| 94 | 19,980,214,279,263 | 48,637,464,270 | 582,410 | - | 1,600,325,190,783 | 21,629,176,351,906 |
| 95 | 21,629,176,351,906 | 50,339,775,520 | 328,777 | - | 1,732,308,949,040 | 23,411,824,747,688 |
| 96 | 23,411,824,747,688 | 52,101,667,663 | 167,474 | - | 1,874,989,946,913 | 25,338,916,194,790 |
| 97 | 25,338,916,194,790 | 53,925,226,031 | 73,900 | - | 2,029,228,805,430 | 27,422,070,152,351 |
| 98 | 27,422,070,152,351 | 55,812,608,942 | 30,258 | - | 2,195,955,166,693 | 29,673,837,897,729 |
| 99 | 29,673,837,897,729 | 57,766,050,255 | 14,613 | - | 2,376,173,221,387 | 32,107,777,154,758 |
| 100 | 32,107,777,154,758 | 59,787,862,014 | 12,030 | - | 2,570,967,678,705 | 34,738,532,683,448 |

GRS Gabriel Roeder Smith \& Company

## Single Discount Rate Development <br> Present Values of Projected Benefits Beginning September 1, 2014

| Year | Projected Beginning Plan Net Position | Projected Benefit Payments | Funded Portion of Benefit Payments | Unfunded Portion of Benefit Payments | Present Value of Funded Benefit Payments using Expected Return Rate (v) | Present Value of <br> Unfunded Benefit <br> Payments using <br> Municipal Bond <br> Rate (vf) | Present Value of Benefit <br> Payments using <br> Single Discount Rate (sdr) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| (a) | (b) | (c) | (d) | (e) | (f)=(d)*v^((a)-.5) | (g)=(e)*vf $\wedge($ (a) -5$)$ | (h) $=\left((\mathrm{c}) /(1+\mathrm{sdr})^{\wedge}(\mathrm{a}-5)\right.$ |
| 1 | 132,779,243,085 | \$ 9,291,724,697 | \$ 9,291,724,697 | \$ | \$ 8,940,966,258 | \$ - | \$ 8,940,966,258 |
| 2 | 138,932,057,522 | 9,848,820,467 | 9,848,820,467 | - | 8,775,029,549 |  | 8,775,029,549 |
| 3 | 145,418,483,191 | 10,376,148,598 | 10,376,148,598 | - | 8,560,059,708 | - | 8,560,059,708 |
| 4 | 152,036,656,029 | 10,914,401,080 | 10,914,401,080 | - | 8,337,133,675 | - | 8,337,133,675 |
| 5 | 158,820,344,025 | 11,452,977,103 | 11,452,977,103 | - | 8,100,493,778 | - | 8,100,493,778 |
| 6 | 165,579,412,160 | 11,933,469,047 | 11,933,469,047 | - | 7,815,127,285 | - | 7,815,127,285 |
| 7 | 172,379,973,344 | 12,504,559,319 | 12,504,559,319 | - | 7,582,527,262 | - | 7,582,527,262 |
| 8 | 179,138,090,921 | 13,088,629,037 | 13,088,629,037 | - | 7,348,792,634 | - | 7,348,792,634 |
| 9 | 185,841,027,804 | 13,685,041,157 | 13,685,041,157 | - | 7,114,496,765 | - | 7,114,496,765 |
| 10 | 192,473,751,077 | 14,303,480,735 | 14,303,480,735 | - | 6,885,192,044 | - | 6,885,192,044 |
| 11 | 199,007,437,747 | 14,665,985,472 | 14,665,985,472 | - | 6,536,749,131 | - | 6,536,749,131 |
| 12 | 205,697,904,161 | 15,335,603,124 | 15,335,603,124 | - | 6,328,891,825 | - | 6,328,891,825 |
| 13 | 212,234,047,112 | 16,028,255,880 | 16,028,255,880 | - | 6,124,763,497 | - | 6,124,763,497 |
| 14 | 218,574,092,042 | 16,746,326,770 | 16,746,326,770 | - | 5,925,143,354 | - | 5,925,143,354 |
| 15 | 224,671,185,167 | 17,488,551,365 | 17,488,551,365 | - | 5,729,403,148 | - | 5,729,403,148 |
| 16 | 230,477,179,024 | 18,242,625,017 | 18,242,625,017 | - | 5,533,744,727 | - | 5,533,744,727 |
| 17 | 235,954,286,581 | 19,000,011,761 | 19,000,011,761 | - | 5,336,566,237 | - | 5,336,566,237 |
| 18 | 241,072,025,487 | 19,747,174,400 | 19,747,174,400 | - | 5,135,576,947 | - | 5,135,576,947 |
| 19 | 245,812,618,534 | 20,479,210,762 | 20,479,210,762 | - | 4,931,439,836 | - | 4,931,439,836 |
| 20 | 250,163,209,644 | 21,176,823,669 | 21,176,823,669 | - | 4,721,691,284 | - | 4,721,691,284 |
| 21 | 254,133,216,460 | 21,832,002,531 | 21,832,002,531 | - | 4,507,197,466 | - | 4,507,197,466 |
| 22 | 257,743,813,807 | 22,406,140,380 | 22,406,140,380 | - | 4,283,081,217 | - | 4,283,081,217 |
| 23 | 261,064,202,074 | 22,875,298,259 | 22,875,298,259 | - | 4,048,855,401 | - | 4,048,855,401 |
| 24 | 264,197,731,780 | 23,254,079,624 | 23,254,079,624 | - | 3,811,017,133 | - | 3,811,017,133 |
| 25 | 267,237,399,716 | 23,562,472,390 | 23,562,472,390 | - | 3,575,517,016 | - | 3,575,517,016 |
| 26 | 270,260,179,927 | 23,810,148,560 | 23,810,148,560 | - | 3,345,463,841 | - | 3,345,463,841 |
| 27 | 273,338,517,674 | 24,014,101,287 | 24,014,101,287 | - | 3,124,185,538 | - | 3,124,185,538 |
| 28 | 276,531,018,485 | 24,187,628,997 | 24,187,628,997 | - | 2,913,667,721 | - | 2,913,667,721 |
| 29 | 279,885,958,705 | 24,350,000,573 | 24,350,000,573 | - | 2,715,951,088 | - | 2,715,951,088 |
| 30 | 283,433,575,766 | 24,513,388,864 | 24,513,388,864 | - | 2,531,643,607 | - | 2,531,643,607 |
| 31 | 287,193,050,113 | 24,683,870,702 | 24,683,870,702 | - | 2,360,416,928 | - | 2,360,416,928 |
| 32 | 291,178,259,271 | 24,810,566,499 | 24,810,566,499 | - | 2,196,789,190 | - | 2,196,789,190 |
| 33 | 295,461,803,506 | 24,869,275,366 | 24,869,275,366 | - | 2,038,877,240 | - | 2,038,877,240 |
| 34 | 300,149,190,212 | 24,862,410,405 | 24,862,410,405 | - | 1,887,328,170 | - | 1,887,328,170 |
| 35 | 305,352,251,926 | 24,807,387,689 | 24,807,387,689 | - | 1,743,658,654 | - | 1,743,658,654 |
| 36 | 311,173,391,588 | 24,726,967,213 | 24,726,967,213 | - | 1,609,264,879 | - | 1,609,264,879 |
| 37 | 317,697,607,266 | 24,594,133,720 | 24,594,133,720 | - | 1,482,055,457 | - | 1,482,055,457 |
| 38 | 325,047,178,595 | 24,380,962,919 | 24,380,962,919 | - | 1,360,379,326 | - | 1,360,379,326 |
| 39 | 333,385,828,035 | 24,060,050,508 | 24,060,050,508 | - | 1,243,030,968 | - | 1,243,030,968 |
| 40 | 342,921,490,776 | 23,604,802,331 | 23,604,802,331 | - | 1,129,177,007 | - | 1,129,177,007 |
| 41 | 353,909,032,469 | 23,027,404,042 | 23,027,404,042 | - | 1,019,959,398 | - | 1,019,959,398 |
| 42 | 366,611,100,656 | 22,366,881,948 | 22,366,881,948 | - | 917,317,318 | - | 917,317,318 |
| 43 | 381,268,336,326 | 21,638,532,873 | 21,638,532,873 | - | 821,709,302 | - | 821,709,302 |
| 44 | 398,123,034,452 | 20,840,044,904 | 20,840,044,904 | - | 732,765,961 | - | 732,765,961 |
| 45 | 417,439,474,200 | 19,993,385,914 | 19,993,385,914 | - | 650,922,419 | - | 650,922,419 |
| 46 | 439,479,118,395 | 19,106,251,986 | 19,106,251,986 | - | 575,963,055 | - | 575,963,055 |
| 47 | 464,516,363,451 | 18,180,674,612 | 18,180,674,612 | - | 507,464,147 | - | 507,464,147 |
| 48 | 492,845,859,266 | 17,230,417,044 | 17,230,417,044 | - | 445,315,081 | - | 445,315,081 |
| 49 | 524,771,024,529 | 16,260,479,334 | 16,260,479,334 | - | 389,117,894 | - | 389,117,894 |
| 50 | 560,614,585,650 | 15,278,347,430 | 15,278,347,430 | - | 338,532,591 | - | 338,532,591 |

## Single Discount Rate Development <br> PVs of Projected Benefits Beginning September 1, 2014 (continued)

| Year | Projected Beginning Plan Net Position | Projected Benefit Payments | Funded Portion of Benefit Payments | Unfunded Portion of Benefit Payments | Present Value of Funded Benefit Payments using Expected Return Rate (v) | Present Value of Unfunded Benefit Payments using Municipal Bond Rate (vf) | Present Value of Benefit <br> Payments using Single Discount Rate (sdr) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| (a) | (b) | (c) | (d) | (e) | (f)=(d)*v^((a)-.5) | (g)=(e)*vf^((a)-.5) | (h) $=\left((\mathrm{c}) /(1+\mathrm{sdr})^{\wedge}(\mathrm{a}-.5)\right.$ |
| 51 | \$ 600,717,336,360 | \$ 14,198,664,639 | \$ 14,198,664,639 | \$ | \$ 291,304,940 | \$ | \$ 291,304,940 |
| 52 | 645,536,375,383 | 13,217,808,746 | 13,217,808,746 | - | 251,093,839 | - | 251,093,839 |
| 53 | 695,361,584,987 | 12,242,454,213 | 12,242,454,213 | - | 215,338,322 | - | 215,338,322 |
| 54 | 750,602,946,972 | 11,284,154,670 | 11,284,154,670 | - | 183,779,943 | - | 183,779,943 |
| 55 | 811,690,991,631 | 10,349,643,431 | 10,349,643,431 | - | 156,074,055 | - | 156,074,055 |
| 56 | 879,083,927,452 | 9,442,472,738 | 9,442,472,738 | - | 131,846,107 | - | 131,846,107 |
| 57 | 953,273,476,570 | 8,567,281,126 | 8,567,281,126 | - | 110,764,562 | - | 110,764,562 |
| 58 | 1,034,786,339,969 | 7,727,802,027 | 7,727,802,027 | - | 92,510,291 | - | 92,510,291 |
| 59 | 1,124,188,029,604 | 6,927,418,420 | 6,927,418,420 | - | 76,785,943 | - | 76,785,943 |
| 60 | 1,222,086,378,700 | 6,169,587,069 | 6,169,587,069 | - | 63,320,254 | - | 63,320,254 |
| 61 | 1,329,134,844,355 | 5,457,210,019 | 5,457,210,019 | - | 51,860,113 | - | 51,860,113 |
| 62 | 1,446,036,772,450 | 4,792,745,272 | 4,792,745,272 | - | 42,171,921 | - | 42,171,921 |
| 63 | 1,573,549,872,197 | 4,178,135,861 | 4,178,135,861 | - | 34,040,650 | - | 34,040,650 |
| 64 | 1,712,491,123,134 | 3,614,631,884 | 3,614,631,884 | - | 27,268,145 | - | 27,268,145 |
| 65 | 1,863,742,260,413 | 3,102,745,834 | 3,102,745,834 | - | 21,672,748 | - | 21,672,748 |
| 66 | 2,028,255,746,170 | 2,642,232,234 | 2,642,232,234 | - | 17,088,935 | - | 17,088,935 |
| 67 | 2,207,061,240,613 | 2,232,095,700 | 2,232,095,700 | - | 13,366,973 | - | 13,366,973 |
| 68 | 2,401,272,583,306 | 1,870,587,115 | 1,870,587,115 | - | 10,372,285 | - | 10,372,285 |
| 69 | 2,612,095,337,844 | 1,555,189,807 | 1,555,189,807 | - | 7,984,655 | - | 7,984,655 |
| 70 | 2,840,834,955,409 | 1,282,707,774 | 1,282,707,774 | - | 6,097,850 | - | 6,097,850 |
| 71 | 3,088,905,500,705 | 1,049,505,472 | 1,049,505,472 | - | 4,619,659 | - | 4,619,659 |
| 72 | 3,357,838,827,792 | 851,769,194 | 851,769,194 | - | 3,471,550 | - | 3,471,550 |
| 73 | 3,649,294,219,393 | 685,640,275 | 685,640,275 | - | 2,587,462 | - | 2,587,462 |
| 74 | 3,965,068,660,005 | 547,337,007 | 547,337,007 | - | 1,912,532 | - | 1,912,532 |
| 75 | 4,307,107,805,286 | 433,234,208 | 433,234,208 | - | 1,401,693 | - | 1,401,693 |
| 76 | 4,677,517,747,459 | 339,949,360 | 339,949,360 | - | 1,018,405 | - | 1,018,405 |
| 77 | 5,078,577,633,640 | 264,376,515 | 264,376,515 | - | 733,340 | - | 733,340 |
| 78 | 5,512,753,259,644 | 203,720,857 | 203,720,857 | - | 523,232 | - | 523,232 |
| 79 | 5,982,711,716,660 | 155,481,456 | 155,481,456 | - | 369,755 | - | 369,755 |
| 80 | 6,491,337,228,914 | 117,465,261 | 117,465,261 | - | 258,655 | - | 258,655 |
| 81 | 7,041,748,245,197 | 87,792,619 | 87,792,619 | - | 178,997 | - | 178,997 |
| 82 | 7,637,315,893,396 | 64,880,460 | 64,880,460 | - | 122,484 | - | 122,484 |
| 83 | 8,281,683,930,353 | 47,390,725 | 47,390,725 | - | 82,839 | - | 82,839 |
| 84 | 8,978,790,342,825 | 34,203,105 | 34,203,105 | - | 55,358 | - | 55,358 |
| 85 | 9,732,890,706,449 | 24,386,557 | 24,386,557 | - | 36,546 | - | 36,546 |
| 86 | 10,548,583,444,658 | 17,175,607 | 17,175,607 | - | 23,833 | - | 23,833 |
| 87 | 11,430,837,134,635 | 11,944,575 | 11,944,575 | - | 15,347 | - | 15,347 |
| 88 | 12,385,020,026,293 | 8,203,168 | 8,203,168 | - | 9,759 | - | 9,759 |
| 89 | 13,416,931,929,159 | 5,557,922 | 5,557,922 | - | 6,122 | - | 6,122 |
| 90 | 14,532,838,692,176 | 3,710,941 | 3,710,941 | - | 3,785 | - | 3,785 |
| 91 | 15,739,509,445,136 | 2,431,565 | 2,431,565 | - | 2,296 | - | 2,296 |
| 92 | 17,044,256,850,893 | 1,558,429 | 1,558,429 | - | 1,363 | - | 1,363 |
| 93 | 18,454,980,577,698 | 972,732 | 972,732 | - | 788 | - | 788 |
| 94 | 19,980,214,279,263 | 582,410 | 582,410 | - | 437 | - | 437 |
| 95 | 21,629,176,351,906 | 328,777 | 328,777 | - | 228 | - | 228 |
| 96 | 23,411,824,747,688 | 167,474 | 167,474 | - | 108 | - | 108 |
| 97 | 25,338,916,194,790 | 73,900 | 73,900 | - | 44 | - | 44 |
| 98 | 27,422,070,152,351 | 30,258 | 30,258 | - | 17 | - | 17 |
| 99 | 29,673,837,897,729 | 14,613 | 14,613 | - | 7 | - | 7 |
| 100 | 32,107,777,154,758 | 12,030 | 12,030 | - | 6 | - | 6 |
|  |  |  |  | Totals | \$ 195,892,593,135 | \$ | \$ 195,892,593,135 |

