## QR $\begin{aligned} & \text { Gabriel Roeder Smith \& Company } \\ & \text { Consultants \& Actuaries }\end{aligned}$

[^0]
# TABLE OF CONTENTS <br> DECEMBER 31, 2008 

## Page

1
Introduction

2-3 Section A-Operation of the System

## Section B - Core Annuities

4 Development of Assets and Liabilities
5
6
7
8-9
10-11
12
Reserve Transfer Recommendation
Discussion of Dividend
Transfers to Annuity Reserve
Core Annuities Being Paid - Type and Option
Core Annuities Being Paid - Attained Ages
Projection of Future Core Annuity Payments

## Section C - Variable Annuities

13
14
15

Section D-Comparative Statements
Annuities by Valuation Year
Annuities by Type
Annuities by Year of Retirement
Actual vs. Expected Deaths

## Section E - Appendix

Single Life Retirement Values
Statutory Provisions
Narrative Regarding the Development of Dividend and

Variable Annuity Changes

March 3, 2009

Employee Trust Funds Board
Madison, Wisconsin
Ladies and Gentlemen:
The results of the 26th annual actuarial valuation of core and variable annuities being paid from the Wisconsin Retirement System are presented in this report. The valuation was based upon data, furnished by the WRS staff, concerning Fund assets and individual annuitants and beneficiaries.

The date of this valuation was December 31, 2008. Actuarial assumptions used in the valuation are summarized in the Appendix.

The results of the valuation may be briefly summarized as follows (\$ millions).

|  | Core | Variable |
| :--- | ---: | ---: |
| Number of Annuitants | 144,107 | 34,927 |
| Annual Amount | $\$ 3,399.3$ | $\$ 427.0$ |
| Fund Balance | $35,798.1$ | $2,574.5$ |
| Actuarial Reserve | $36,551.5$ | $4,491.0$ |
| Ratio | $\mathbf{0 . 9 7 9}$ | $\mathbf{0 . 5 7 3}$ |

Based upon these results, core annuities were decreased by $2.1 \%$ effective April, 2009 and variable annuities were decreased by $42 \%$.

To the best of our knowledge, this report is complete and accurate and was made in accordance with standards of practice prescribed by the American Standards Board. All of the undersigned are Members of the American Academy of Actuaries (MAAA) and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

The cooperation of the Secretary and his staff in gathering materials for this valuation is acknowledged with appreciation.

Respectfully submitted,


Brian B. Murphy, PSA, MAAA
BBM/NLJ/MB:lr

## SECTION A <br> OPERATION OF THE SYSTEM

## OpERATION OF THE RETIREMENT SYSTEM

Each year, as of December 31, an actuarial valuation of the liability for retired persons receiving benefits from the Wisconsin Retirement System is conducted. The purpose of the valuation is to determine the actuarial present value of future benefit payments on behalf of current retired lives. This present value is the "actuarial reserve". Theoretically, if an amount of money equal to the actuarial present value were invested at a yield equal to the valuation interest rate, the initial amount plus the continuing investment income would provide exactly the right amount of money to pay the annuities of all current retired persons and their beneficiaries for the rest of their lives. The fund would decrease each year, and would become zero many decades in the future when the last annuitant dies.

The above is a "closed group" description of the operation of the annuity reserve fund. But the fund is really an "open group". The size of the fund does not actually decrease because each year more benefits are added to the rolls than are removed, and fresh money is transferred into the annuity reserve fund to finance the benefits of the new annuitants. (The actuary calculates the reserve transfers for new annuitants each year as a by-product of the actuarial valuation.)

According to theory, the fund will eventually reach a state when the number of people entering (retiring) each year is approximately equal to the number of people exiting (dying) each year. When this mature state is reached, the amount of money in the fund will remain approximately level in constant dollars from year to year. Each year, the reserve transfers for the new annuitants plus investment earnings on the whole fund (total money in) will be approximately equal to the benefit payments (total money out). The only source of growth in assets would be the result of the effects of inflation. The dollars in the fund would increase, but the "real" value of the fund would not change.

There are at least two factors that cause the actual operation to be different from the theoretical operation described above. The first is that annuitants may have longer or shorter lifetimes than expected. In recognition of this, the actuary monitors mortality experience of the retirement system and recommends a new mortality table when appropriate. The second factor is that actual investment earnings are rarely equal to the assumed rate. When investment earnings differ from the assumed rate, the difference, positive or negative, is recorded in a supplemental reserve.

## OPERATION OF THE RETIREMENT SYSTEM

The Wisconsin Retirement System maintains separate reserves for core and variable annuities. Each year, the actuary determines the actuarial reserve for core and variable annuities separately. WRS' practice with respect to the use of supplemental reserves is described below.

Core Annuity Division: If the supplemental reserve is positive and is at least $0.5 \%$ of core annuity liabilities, core annuity increases (dividends) may be granted. If the supplemental reserve is negative and is equal to or greater than $0.5 \%$ of core annuity liabilities in absolute value, prior core annuity dividends are reduced by an aggregate amount equal to the shortfall. Increases or decreases become effective in April following the December 31 valuation.

Variable Annuity Division: If the supplemental reserve is at least 2\% of variable annuity liabilities, substantially all of the reserve (dropping fractions of a percent) is used to increase or decrease variable annuities for the ensuing year. Increases or decreases become effective in April following the December 31 valuation.

## SECTION B <br> CORE ANNUITIES

## Core Annuity Division <br> DEVELOPMENT OF ASSETS AND LIABILITIES



The ending liability balance includes data and mortality reserves of $\$ 612$ million.

## RESERVE TRANSFER RECOMMENDATION DECEMBER 31, 2008

Amounts to be transferred from the Employer Reserve and the Employee Reserve to the Annuity Reserve to cover liabilities for new annuities are computed as the first step in the annual actuarial valuation. The actuarial present value at time of retirement of core annuities reported as new since the last actuarial valuation is $\$ 2,844,186,779$. Adjustments to prior transfers, related to estimated annuities for which final computations have now been made, totaled $\$ 25,714,186$. Reserve transfers are distributed as follows:

| Group | Regular <br> Transfer | Adjustment to Prior Transfer | Total Transfer |
| :---: | :---: | :---: | :---: |
| General | \$2,555,333,534 | \$25,926,403 | \$2,581,259,937 |
| Protective with Social Security | 200,419,428 | $(309,068)$ | 200,110,360 |
| Protective without Social Security | 66,695,198 | 230,440 | 66,925,638 |
| Executive \& Elected | 21,738,619 | $(133,589)$ | 21,605,030 |
| Totals | \$2,844,186,779 | \$25,714,186 | \$2,869,900,965 |

Accordingly, we recommend that $\$ 2,869,900,965$ be transferred to the Core Annuity Reserve. The results in this report assume that this transfer has been made.

## DISCUSSION OF DIVIDEND DECEMBER 31, 2008

The Core Annuity Fund Balance, $\$ 35,798.1$ million, was less than the actuarial present value of core annuities and reserves, $\$ 36,551.5$ million, by $\$ 753.4$ million or ( 2.1 )\% of the actuarial present value (APV) of core annuity payments. The primary sources of the (2.1)\% are:

| 1. SWIB published investment return | $(26.20) \%$ |
| :--- | :---: |
| 2. MRA adjustment | $29.50 \%$ |
| 3. Published effective earnings rate | $3.30 \%$ |
| 4. Adjustment to relate earnings to average fixed |  |
| annuity balance | $(0.16) \%$ |
| 5. Earnings rate based on average balance | $3.14 \%$ |
| 6. Expected dividend before adjustments: | $(1.77) \%$ |
| 1.0314/1.05-1 | $0.02 \%$ |
| 7. Adjustment to relate average asset to ending liability | $0.42 \%$ |
| 8. Carryover from last year due to timing of dividend | $(0.61) \%$ |
| accounting adjustments and rounding | $0.00 \%$ |
| 9. Adjustments to contingency reserve and data reserve | $(0.12) \%$ |
| 10. Experience Study | $(0.04) \%$ |
| 11. Experience and other effects | $(\mathbf{2 . 1 ) \%}$ |
| 12. Statutory adjustment to round to nearest one-tenth percent |  |
| 13. Computed dividend rate: (6)+(7)+(8)+(9)+(10)+(11)+(12) |  |

In accordance with the Administrative Code, ETF 20.25 and Section 40.27(2) Wisconsin Statutes (see page 27), the (2.1)\% was effective April, 2009.

# Transfers to Annuity Reserve to Finance Core Annuities Approved in 2008 TAbULATED BY Type of Annuity and Option 

| Alpha <br> Code | Type of Benefit | Number | Annual Amount | Present Value |
| :---: | :---: | :---: | :---: | :---: |
|  | REGULAR RETIREMENT |  |  |  |
| SL | Straight Life | 1,146 | \$ 23,153,526 | \$ 313,165,975 |
| SL | Straight Life (accelerated) | 0 | 4,773,407 | 16,910,986 |
| A60 | Life Annuity with 60 payments guaranteed | 852 | 17,341,205 | 234,048,823 |
| A60 | Life Annuity with 60 payments guaranteed (accelerated) | 0 | 3,988,745 | 13,459,259 |
| A180 | Life Annuity with 180 payments guaranteed | 1,692 | 32,039,398 | 458,641,791 |
| A180 | Life Annuity with 180 payments guaranteed (accelerated) | 0 | 9,374,336 | 36,841,858 |
| A180F | Life Annuity with 180 payments guaranteed (forced) | 39 | 216,310 | 2,615,654 |
| JOINT | Joint and 75\% Survivor | 846 | 20,446,476 | 308,330,832 |
| JOINT | Joint and 75\% Survivor (accelerated) | 0 | 5,887,890 | 22,858,943 |
| R25 | Reduced 25\% on First Death | 409 | 11,119,692 | 159,097,999 |
| R25 | Reduced 25\% on First Death (accelerated) | 0 | 1,941,296 | 7,588,737 |
| C100 | 100\% Continued to Named Survivor | 687 | 13,919,891 | 212,268,014 |
| C100 | 100\% Continued to Named Survivor (accelerated) | 0 | 3,361,244 | 12,352,472 |
| C180 | 100\% Continued to Named Survivor with 180 payments guaranteed | 2,476 | 56,511,087 | 887,814,157 |
| C180 | 100\% Continued to Named Survivor with 180 payments guaranteed (accelerated) | 0 | 17,672,429 | 70,000,670 |
| AC24 | Annuity Certain with 24 Payments | 1 | 14,692 | 30,212 |
| AC60 | Annuity Certain with 60 Payments | 1 | 27,353 | 121,357 |
| AC120 | Annuity Certain with 120 Payments | 3 | 46,838 | 373,152 |
| AC180 | Annuity Certain between 24 and 180 Payments | 11 | 613,798 | 5,042,755 |
| SLNSD | Straight Life - Named Survivor Deceased | 2 | 76,225 | 968,072 |
|  | Total Regular | 8,165 | \$222,525,838 | \$2,762,531,718 |
|  | Average Age at Retirement | 60.1 Years |  |  |
|  | DISABILITY RETIREMENT |  |  |  |
| SL | Straight Life | 21 | \$ 522,954 | \$ 7,064,629 |
| A60 | Life Annuity with 60 payments guaranteed | 12 | 308,344 | 4,137,029 |
| A180 | Life Annuity with 180 payments guaranteed | 41 | 913,851 | 12,400,665 |
| JOINT | Joint and 75\% Survivor | 6 | 174,151 | 2,553,216 |
| R25 | Reduced 25\% on First Death | 4 | 151,243 | 2,336,944 |
| C100 | 100\% Continued to Named Survivor | 27 | 648,668 | 9,732,184 |
| C180 | 100\% Continued to Named Survivor with 180 payments guaranteed | 63 | 1,551,452 | 25,141,276 |
|  | Total Disability | 174 | \$ 4,270,663 | \$ 63,365,943 |
|  | Average Age at Retirement | 54.3 Years |  |  |
|  | DEATH-IN-SERVICE BENEFITS |  |  |  |
| SL | Straight Life | 6 | \$ 182,214 | \$ 2,489,777 |
| A60 | Life Annuity with 60 payments guaranteed | 5 | 187,362 | 2,102,369 |
| A60 | Life Annuity with 60 payments guaranteed (accelerated) | 0 | 6,444 | 30,745 |
| A180 | Life Annuity with 180 payments guaranteed | 49 | 851,019 | 12,658,654 |
| A180 | Life Annuity with 180 payments guaranteed (accelerated) | 0 | 191,928 | 1,003,785 |
| AC180 | Annuity Certain between 24 and 180 Payments | 1 | 2,079 | 3,793 |
|  | Total Death-in-Service | 61 | \$ 1,421,046 | \$ 18,289,123 |
|  | Average Age at Retirement | 52.8 Years |  |  |
|  | GRAND TOTAL | 8,400 | \$228,217,547 | \$2,844,186,784 |

In cases where an individual is receiving more than one annuity, the person only appears once in the above number counts, but the corresponding annual amounts can show up in several different places, depending on the option elected for the different annuities. This can result in, for example, a number count of zero (or a very low number count) combined with a significant annual dollar amount in the above table.

## Core Annuities Being Paid December 31, 2008 TABULATED BY TYPE OF ANNUITY AND OPTION


(concluded on next page)

In cases where an individual is receiving more than one annuity, the person only appears once in the above number counts, but the corresponding annual amounts can show up in several different places, depending on the option elected for the different annuities. This can result in, for example, a number count of zero (or a very low number count) combined with a significant annual dollar amount in the above table.

## Core Annuities Being Paid December 31, 2008 Tabulated by Type of Annuity and Option

| Alpha Code | Type of Benefit | Number | Annual <br> Amount |  | Present <br> Value |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | DISABILITY RETIREMENT |  |  |  |  |  |
| SL | Straight Life | 873 | \$ | 21,254,746 | \$ | 190,599,950 |
| A60 | Life Annuity with 60 payments guaranteed | 477 |  | 11,782,227 |  | 115,940,244 |
| A180 | Life Annuity with 180 payments guaranteed | 1,226 |  | 28,817,910 |  | 305,612,465 |
| JOINT | Joint and 75\% Survivor | 516 |  | 11,638,074 |  | 131,785,745 |
| R25 | Reduced 25\% on First Death | 247 |  | 5,472,235 |  | 59,966,840 |
| C100 | 100\% Continued to Named Survivor | 1,306 |  | 25,411,105 |  | 305,688,692 |
| C180 | 100\% Continued to Named Survivor with 180 payments guaranteed | 1,675 |  | 35,174,106 |  | 483,278,008 |
| AC180 | Annuity Certain between 24 and 180 Payments | 2 |  | 11,380 |  | 19,762 |
| DWSMC | Disability with Spouse or Minor/Dependent Child | 36 |  | 838,868 |  | 7,383,601 |
| DWOSMC | Disability without Spouse or Minor/Dependent Child | 5 |  | 115,673 |  | 1,167,202 |
| CWD | Conservation Warden - Disability | 1 |  | 1,535 |  | 5,402 |
| PF6213 | Police and Firemen s.62.13 | 28 |  | 626,366 |  | 3,366,770 |
| SLNSD | Straight Life - Named Survivor Deceased | 5 |  | 81,351 |  | 572,229 |
|  | Total Disability | 6,397 | \$ | 141,225,576 | \$ | 1,605,386,910 |
|  | DEATH-IN-SERVICE BENEFITS |  |  |  |  |  |
| SL | Straight Life | 197 | \$ | 2,706,523 | \$ | 27,826,961 |
| SL | Straight Life (accelerated) | 0 |  | 135,612 |  | 225,265 |
| A60 | Life Annuity with 60 payments guaranteed | 120 |  | 1,944,785 |  | 19,639,410 |
| A60 | Life Annuity with 60 payments guaranteed (accelerated) | 0 |  | 56,181 |  | 246,863 |
| A180 | Life Annuity with 180 payments guaranteed | 704 |  | 8,444,572 |  | 101,459,863 |
| A180 | Life Annuity with 180 payments guaranteed (accelerated) | 0 |  | 971,509 |  | 4,119,432 |
| C180 | 100\% Continued to Named Survivor with 180 payments guaranteed | 3 |  | 12,169 |  | 201,297 |
| LOL | Life with Optional Length Guaranteed | 15 |  | 160,808 |  | 853,477 |
| AC180 | Annuity Certain between 24 and 180 Payments | 8 |  | 90,653 |  | 303,185 |
| A60WSS | Life with 60 Months Guaranteed and Social Security Integrated | 83 |  | 126,312 |  | 598,725 |
| A180WSS | Life with 180 Months Guaranteed and Social Security Integrated | 1 |  | 12,720 |  | 76,079 |
| PF6213 | Police and Firemen s.62.13 | 3 |  | 99,027 |  | 663,174 |
|  | Total Death-in-Service | 1,134 | \$ | 14,760,871 | \$ | 156,213,731 |
|  | GRAND TOTAL | 144,033 |  | ,399,273,572 |  | 5,939,481,382 |

In cases where an individual is receiving more than one annuity, the person only appears once in the above number counts, but the corresponding annual amounts can show up in several different places, depending on the option elected for the different annuities. This can result in, for example, a number count of zero (or a very low number count) combined with a significant annual dollar amount in the above table.

Core Annuities Being Paid December 31, 2008
Tabulated by Attained Ages

| Attained Ages | Regular |  | Disability |  | Death-in-Service |  | Totals |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | No. | Annual <br> Amount | No. | Annual <br> Amount | No. | Annual <br> Amount | No. |  | Annual Amount |
| Under 20 | 0 | \$ 0 | 0 | \$ 0 | 6 | \$ 37,915 | 6 | \$ | 37,915 |
| 20-24 | 0 | 0 | 5 | 46,114 | 9 | 68,226 | 14 |  | 114,340 |
| 25-29 | 0 | 0 | 5 | 35,322 | 12 | 87,519 | 17 |  | 122,841 |
| 30-34 | 1 | 5,869 | 13 | 135,631 | 16 | 94,737 | 30 |  | 236,237 |
| 35-39 | 6 | 43,847 | 30 | 469,156 | 21 | 123,068 | 57 |  | 636,071 |
| 40-44 | 17 | 194,991 | 91 | 1,694,172 | 22 | 180,500 | 130 |  | 2,069,663 |
| 45-49 | 75 | 803,847 | 218 | 4,423,812 | 34 | 296,182 | 327 |  | 5,523,841 |
| 50-54 | 1,125 | 30,446,247 | 627 | 14,088,629 | 75 | 968,201 | 1,827 |  | 45,503,077 |
| 55-59 | 14,792 | 448,140,962 | 1,120 | 27,276,451 | 116 | 2,227,186 | 16,028 |  | 477,644,599 |
| 60-64 | 26,800 | 731,527,043 | 1,172 | 27,185,349 | 144 | 2,569,864 | 28,116 |  | 761,282,256 |
| 65-69 | 27,375 | 595,630,758 | 1,010 | 22,998,492 | 142 | 2,330,034 | 28,527 |  | 620,959,284 |
| 70-74 | 22,187 | 487,352,540 | 817 | 18,413,285 | 107 | 1,512,971 | 23,111 |  | 507,278,796 |
| 75-79 | 17,611 | 404,592,825 | 641 | 12,981,733 | 112 | 1,245,388 | 18,364 |  | 418,819,946 |
| 80-84 | 13,214 | 293,598,718 | 404 | 7,462,371 | 128 | 1,453,470 | 13,746 |  | 302,514,559 |
| 85-89 | 8,057 | 164,771,473 | 179 | 3,054,945 | 83 | 759,132 | 8,319 |  | 168,585,550 |
| 90-94 | 3,412 | 55,530,722 | 56 | 861,372 | 52 | 329,372 | 3,520 |  | 56,721,466 |
| 95\& Up | 923 | 12,639,666 | 8 | 87,390 | 16 | 110,698 | 947 |  | 12,837,754 |
| Certain Only* | 907 | 18,007,617 | 10 | 11,352 | 104 | 366,408 | 1,021 |  | 18,385,377 |
| Totals | 136,502 | \$3,243,287,125 | 6,406 | \$141,225,576 | 1,199 | \$14,760,871 | 144,107 |  | ,399,273,572 |


| Averages in Years |  |  | 50.9 | 59.6 |
| :--- | :--- | :--- | :--- | :--- |
| Age at retirement | 60.0 | 52.0 | 67.7 | 70.3 |

[^1]
## Core Annuities Being Paid By Attained Age* DECEMBER 31, 2008



Annual \$ Millions

Number of Recipients

Attained Age Groups

* Includes regular and disability retirees and survivor beneficiaries. The "certain" category includes annuities paid for a fixed period which is not dependent upon the age of the recipient.

Projected Future Core Annuity Payments

## On Behalf of Present Retired Lives

Including Future Dividends


## SECTION C

## VARIABLE ANNUITIES

## VARIABLE ANNUITY DIVISION DEVELOPMENT OF ASSETS AND LIABILITIES

|  | \$ M |  |  |
| :---: | :---: | :---: | :---: |
|  | Assets | Liabilities | Ratio |
| Ending Balance December 31, 2007 | \$4,625.0 | \$4,563.7 | 1.013 |
| Closing Adjustments | (11.1) | 0.0 |  |
| Variable Terminations | (112.4) | (112.4) |  |
| 2008 Adjustment: 0\% | 0.0 | 0.0 |  |
| Beginning Balance January 1, 2008 | 4,501.5 | 4,451.3 | 1.011 |
| Increases |  |  |  |
| Reserve Transfers | 218.2 | 218.2 |  |
| Regular Interest | 217.4 | 217.4 |  |
| Additional Earnings | $(1,933.8)$ | 0.0 |  |
| Addition to Contingency/Data Reserve | 0.0 | 21.2 |  |
| Experience Study | 0.0 | 0.0 |  |
| Other | 0.0 | 11.7 |  |
| Total Increases | $(1,498.2)$ | 468.5 |  |
| Decreases |  |  |  |
| Annuities \& Lump Sums | 427.8 | 427.8 |  |
| Credit Re-establishments | 1.0 | 1.0 |  |
| Release from Contingency/Data Reserve | 0.0 | 0.0 |  |
| Experience Study | 0.0 | 0.0 |  |
| Other | 0.0 | 0.0 |  |
| Total Decreases | 428.8 | 428.8 |  |
| Ending Balance December 31, 2008 | \$2,574.5 | \$4,491.0 | 0.573 |

The ending liability balance includes data and mortality reserves of $\$ 66.4$ million.

## RESERVE TRANSFER RECOMMENDATION DECEMBER 31, 2008

Amounts to be transferred from the Employer Reserve and the Employee Reserve to the Annuity Reserve to cover liabilities for new annuities are computed as the first step in the annual actuarial valuation. The actuarial present value at time of retirement of variable annuities reported as new since the last actuarial valuation is $\$ 217,078,097$. Adjustments to prior transfers, relating to estimated annuities for which final computations have now been made, totaled $\$ 1,165,986$. Reserve transfers were distributed as follows:

| Group | Regular <br> Transfer | Adjustment <br> to Prior Transfer | Total Transfer |
| :--- | :---: | :---: | :---: |
| General | $\$ 203,049,718$ | $\$ 834,122$ | $\$ 203,883,840$ |
| Protective with Social Security | $7,985,173$ | 308,474 | $8,293,647$ |
| Protective without Social Security | $2,052,600$ | 17,816 | $2,070,416$ |
| Executive \& Elected | $3,990,606$ | 5,574 | $3,996,180$ |
| Totals | $\mathbf{\$ 2 1 7 , 0 7 8 , 0 9 7}$ | $\mathbf{\$ 1 , 1 6 5 , 9 8 6}$ | $\mathbf{\$ 2 1 8 , 2 4 4 , 0 8 3}$ |

Accordingly, we recommend that $\$ 218,244,083$ be transferred to the Variable Annuity Reserve. The results in this report assume that this transfer has been made.

## Discussion of Variable AnNuity Change DECEMBER 31, 2008

Variable Annuity Reserves, $\$ 2,574.5$ million, were less than the actuarial present value of variable annuities, $\$ 4,491.0$ million, by $\$ 1,941.5$ million as of December 31, 2008 or (42)\% of the actuarial present value (APV) of variable annuity payments. In accordance with Section 40.28(2) of the Wisconsin statutes (see page 27), variable annuities will be decreased by (42)\% effective April 1, 2009. The primary sources of the (42)\% are as follows:
\% of APV

1. SWIB published investment return(39.0)\%
2. Adjustment to published effective rate ..... (1.0)\%
3. Published effective earnings rate ..... (40.0)\%
4. Adjustment to relate earnings to average variable annuity fund balance ..... 1.0\%
5. Earnings rate based on average balance ..... (39.0)\%
6. Expected change before adjustments: 0.61/1.05-1 ..... (41.9)\%
7. Adjustment to relate average asset to ending liability ..... (1.2)\%
8. Carryover from last year due to timing of distribution, accounting adjustments and truncation ..... 1.1\%
9. Adjustments to contingency reserve ..... (0.5)\%
10. Experience Study ..... 0.0\%
11. Experience and other effects ..... (0.2)\%12. Statutory adjustment (truncate to whole percent or adjust tozero if reserve is less than 2\%)0.7\%
12. Variable annuity change: (6)+(7)+(8)+(9)+(10)+(11)+(12)(42.0)\%

# Transfers to Annuity Reserve to Finance Variable Annuities Approved in 2008 TABULATED BY TYPE OF ANNUITY AND OPTION 

| Alpha <br> Code | Type of Benefit | Number | Annual Amount | Present Value |
| :---: | :---: | :---: | :---: | :---: |
|  | REGULAR RETIREMENT |  |  |  |
| SL | Straight Life | 285 | \$ 1,838,689 | \$ 24,716,803 |
| SL | Straight Life (accelerated) | 0 | 320,592 | 989,341 |
| A60 | Life Annuity with 60 payments guaranteed | 225 | 1,544,461 | 20,394,318 |
| A60 | Life Annuity with 60 payments guaranteed (accelerated) | 0 | 303,171 | 1,139,227 |
| A180 | Life Annuity with 180 payments guaranteed | 404 | 2,707,185 | 38,793,004 |
| A180 | Life Annuity with 180 payments guaranteed (accelerated) | 0 | 656,403 | 2,423,535 |
| A180F | Life Annuity with 180 payments guaranteed (forced) | 2 | 3,788 | 46,825 |
| JOINT | Joint and 75\% Survivor | 227 | 1,745,467 | 25,441,215 |
| JOINT | Joint and 75\% Survivor (accelerated) | 0 | 356,914 | 1,323,241 |
| R25 | Reduced 25\% on First Death | 100 | 1,024,905 | 14,258,758 |
| R25 | Reduced 25\% on First Death (accelerated) | 0 | 75,846 | 252,199 |
| C100 | 100\% Continued to Named Survivor | 163 | 1,127,581 | 16,637,609 |
| C100 | 100\% Continued to Named Survivor (accelerated) | 0 | 186,818 | 693,069 |
| C180 | 100\% Continued to Named Survivor with 180 payments guaranteed | 669 | 3,985,412 | 62,028,323 |
| C180 | 100\% Continued to Named Survivor with 180 payments guaranteed (accelerated) | 0 | 997,400 | 3,495,719 |
| AC120 | Annuity Certain with 120 Payments | 0 | 228 | 1,790 |
| AC180 | Annuity Certain between 24 and 180 Payments | 0 | 80,976 | 644,000 |
|  | Total Regular | 2,075 | \$16,955,836 | \$213,278,976 |
|  | Average Age at Retirement | 59.4 Years |  |  |
|  | DISABILITY RETIREMENT |  |  |  |
| SL | Straight Life | 3 | \$ 22,420 | \$ 301,233 |
| A60 | Life Annuity with 60 payments guaranteed | 5 | 10,218 | 137,086 |
| A180 | Life Annuity with 180 payments guaranteed | 13 | 15,073 | 208,914 |
| JOINT | Joint and 75\% Survivor | 3 | 4,603 | 65,529 |
| R25 | Reduced 25\% on First Death | 3 | 5,045 | 78,179 |
| C100 | 100\% Continued to Named Survivor | 8 | 39,940 | 628,578 |
| C180 | 100\% Continued to Named Survivor with 180 payments guaranteed | 17 | 30,421 | 495,744 |
|  | Total Disability | 52 | \$ 127,720 | \$ 1,915,263 |
|  | Average Age at Retirement | 52.8 Years |  |  |
|  | DEATH-IN-SERVICE BENEFITS |  |  |  |
| SL | Straight Life | 2 | \$ 62,464 | \$ 744,375 |
| A60 | Life Annuity with 60 payments guaranteed | 1 | 17,189 | 240,096 |
| A60 | Life Annuity with 60 payments guaranteed (accelerated) | 0 | 7,356 | 35,091 |
| A180 | Life Annuity with 180 payments guaranteed | 14 | 56,285 | 838,403 |
| A180 | Life Annuity with 180 payments guaranteed (accelerated) | 0 | 4,931 | 25,893 |
|  | Total Death-in-Service | 17 | \$ 148,225 | \$ 1,883,858 |
|  | Average Age at Retirement | 40.8 Years |  |  |
|  | GRAND TOTAL | 2,144 | \$17,231,781 | \$217,078,097 |

In cases where an individual is receiving more than one annuity, the person only appears once in the above number counts, but the corresponding annual amounts can show up in several different places, depending on the option elected for the different annuities. This can result in, for example, a number count of zero (or a very low number count) combined with a significant annual dollar amount in the above table.

## VARIABLE ANNUITIES BEING PAID DECEMBER 31, 2008 TABULATED BY TYPE OF ANNUITY AND OPTION

| Alpha <br> Code | Type of Benefit |  | Annual <br> Amount | Present <br> Value |
| :---: | :--- | ---: | ---: | ---: |
|  |  | Number |  |  |

(concluded on next page)

In cases where an individual is receiving more than one annuity, the person only appears once in the above number counts, but the corresponding annual amounts can show up in several different places, depending on the option elected for the different annuities. This can result in, for example, a number count of zero (or a very low number count) combined with a significant annual dollar amount in the above table.

## VARIABLE ANNUITIES BEING PAID DECEMBER 31, 2008 TAbulated by Type of Annuity and Option

| Alpha <br> Code | Type of Benefit | Number | Annual <br> Amount | Present <br> Value |  |
| :---: | :--- | ---: | ---: | ---: | ---: |
|  | DISABILITY RETIREMENT |  |  |  |  |
| SL | Straight Life | 176 | $\$$ | 906,941 | $\$$ |
| A60 | Life Annuity with 60 payments guaranteed | 82 | $6,576,407$ |  |  |
| A180 | Life Annuity with 180 payments guaranteed | 229 | $1,424,909$ | $5,712,790$ |  |
| JOINT | Joint and 75\% Survivor | 123 | 982,101 | $10,965,660$ |  |
| R25 | Reduced 25\% on First Death | 64 | 441,980 | $4,562,095$ |  |
| C100 | 100\% Continued to Named Survivor | 259 | $1,597,964$ | $17,593,406$ |  |
| C180 | 100\% Continued to Named Survivor with 180 payments guaranteed | 335 | $2,141,738$ | $27,247,805$ |  |
| DWSMC | Disability with Spouse or Minor/Dependent Child | 5 | 20,377 | 89,424 |  |
| DWOSMC Disability without Spouse or Minor/Dependent Child | 1 | 4,701 | 41,822 |  |  |
| SLNSD | Straight Life - Named Survivor Deceased | 1 | 13,247 | 100,938 |  |
|  |  |  | 1,275 | $\$ 8,135,499$ | $\$$ |
|  | Total Disability |  | $86,056,515$ |  |  |

## DEATH-IN-SERVICE BENEFITS

| SL | Straight Life | 53 | \$ | 440,767 | \$ | 4,009,669 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| SL | Straight Life (accelerated) | 0 |  | 15,508 |  | 12,138 |
| A60 | Life Annuity with 60 payments guaranteed | 34 |  | 307,891 |  | 2,878,057 |
| A60 | Life Annuity with 60 payments guaranteed (accelerated) | 0 |  | 14,542 |  | 41,596 |
| A180 | Life Annuity with 180 payments guaranteed | 228 |  | 1,332,991 |  | 13,276,495 |
| A180 | Life Annuity with 180 payments guaranteed (accelerated) | 0 |  | 71,308 |  | 303,684 |
| LOL | Life with Optional Length Guaranteed | 3 |  | 21,632 |  | 109,520 |
| AC180 | Annuity Certain between 24 and 180 Payments | 0 |  | 12,398 |  | 60,488 |
| A60WSS | Life with 60 Months Guaranteed and Social Security Integrated | 31 |  | 33,823 |  | 156,007 |
|  | Total Death-in-Service | 349 | \$ | 2,250,860 | \$ | 20,847,654 |
|  | GRAND TOTAL | 34,927 |  | 26,989,552 |  | 424,619,156 |

In cases where an individual is receiving more than one annuity, the person only appears once in the above number counts, but the corresponding annual amounts can show up in several different places, depending on the option elected for the different annuities. This can result in, for example, a number count of zero (or a very low number count) combined with a significant annual dollar amount in the above table.

| Attained Ages | Regular |  | Disability |  | Death-in-Service |  | Totals |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | No. | Annual Amount | No. | Annual <br> Amount | No. | Annual Amount | No. | Annual <br> Amount |
| 25-29 | 0 | \$ 0 | 1 | \$ 1,213 | 2 | \$ 185 | 3 | \$ 1,398 |
| 30-34 | 0 | 0 | 0 | 0 | 3 | 5,391 | 3 | 5,391 |
| 35-39 | 2 | 15,849 | 11 | 56,638 | 9 | 14,606 | 22 | 87,093 |
| 40-44 | 6 | 51,589 | 15 | 19,230 | 6 | 5,918 | 27 | 76,737 |
| 45-49 | 14 | 39,880 | 44 | 69,389 | 10 | 9,041 | 68 | 118,310 |
| 50-54 | 304 | 1,406,206 | 125 | 285,593 | 23 | 123,470 | 452 | 1,815,269 |
| 55-59 | 3,917 | 34,995,353 | 208 | 918,044 | 32 | 151,737 | 4,157 | 36,065,134 |
| 60-64 | 7,432 | 88,779,056 | 228 | 1,762,368 | 40 | 245,014 | 7,700 | 90,786,438 |
| 65-69 | 5,789 | 77,548,952 | 183 | 1,716,320 | 45 | 502,543 | 6,017 | 79,767,815 |
| 70-74 | 4,660 | 69,627,052 | 157 | 1,285,733 | 28 | 208,203 | 4,845 | 71,120,988 |
| 75-79 | 4,227 | 59,968,641 | 154 | 1,094,407 | 29 | 228,661 | 4,410 | 61,291,709 |
| 80-84 | 3,425 | 45,625,008 | 87 | 568,004 | 45 | 205,319 | 3,557 | 46,398,331 |
| 85-89 | 2,148 | 24,341,152 | 44 | 268,070 | 32 | 276,331 | 2,224 | 24,885,553 |
| 90-94 | 939 | 9,078,926 | 16 | 82,858 | 24 | 129,649 | 979 | 9,291,433 |
| 95\& Up | 251 | 2,293,006 | 2 | 2,544 | 7 | 33,264 | 260 | 2,328,814 |
| Certain Only* | 189 | 2,832,523 | 0 | 5,088 | 14 | 111,528 | 203 | 2,949,139 |
| Totals | 33,303 | \$416,603,193 | 1,275 | \$8,135,499 | 349 | \$2,250,860 | 34,927 | \$426,989,552 |

Averages in Years

| Age at retirement | 59.5 | 52.6 | 51.2 | 59.2 |
| :--- | :--- | :--- | :--- | :--- |
| Attained age | 70.3 | 65.6 | 69.5 | 70.2 |

* Certain only category consists of continuations of 5, 10 and 15-year certain and life annuities to beneficiaries of deceased annuitants.


## SECTION D <br> COMPARATIVE STATEMENTS

Core Annuities
Comparative Statement 1983 THROUGH 2008

| Valuation |  | Annual | Fund | Actuarial |  | Cha |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Date | Number | Annuities | Balance | Reserve | Ratio | Annuities | CPI* |
| 1983 | 57,770 | \$ 177.7 | \$ 1,830.3 | \$ 1,738.3 | 1.053 | 5.0 \% | 3.8 \% |
| 1984 | 60,302 | 214.3 | 2,255.5 | 2,120.3 | 1.064 | 6.0 \% | 4.0 \% |
| 1985 | 62,953 | 257.6 | 2,758.2 | 2,561.0 | 1.077 | 7.2 \% | 3.8 \% |
| 1986 | 65,425 | 303.5 | 3,256.9 | 3,021.2 | 1.078 | 7.6 \% | 1.1 \% |
| 1987 | 67,688 | 366.9 | 3,833.7 | 3,594.6 | 1.067 | 6.7 \% | 4.4 \% |
| 1988 | 70,017 | 420.6 | 4,319.6 | 4,150.9 | 1.041 | 4.1 \% | 4.4 \% |
| 1989 | 73,232 | 488.7 | 5,487.4 | 4,928.1 | 1.113 | 11.3 \% | 4.6 \% |
| 1990 | 77,666 | 611.3 | 6,443.8 | 6,219.1 | 1.036 | 3.6 \% | 6.2 \% |
| 1991 | 79,465 | 660.4 | 7,137.8 | 6,711.3 | 1.063 | 6.3 \% | 3.0 \% |
| 1992 | 81,508 | 732.3 | 7,782.4 | 7,456.6 | 1.044 | 4.4 \% | 3.0 \% |
| 1993 | 83,836 | 801.7 | 8,608.2 | 8,205.3 | 1.049 | 4.9 \% | 2.7 \% |
| 1994 | 86,214 | 882.2 | 9,286.2 | 9,029.6 | 1.028 | 2.8 \% | 2.7 \% |
| 1995 | 88,998 | 955.8 | 10,351.7 | 9,804.1 | 1.056 | 5.6 \% | 2.6 \% |
| 1996 | 92,198 | 1,065.8 | 11,699.8 | 10,977.1 | 1.066 | 6.6 \% | 3.3 \% |
| 1997 | 95,128 | 1,188.4 | 13,185.1 | 12,240.4 | 1.077 | 7.7 \% | 1.7 \% |
| 1998 | 99,112 | 1,349.5 | 14,951.8 | 13,943.0 | 1.072 | 7.2 \% | 1.6 \% |
| 1999 | 102,817 | 1,513.8 | 16,857.8 | 15,687.2 | 1.075 | 17.1 \% ** | 2.7 \% |
| 2000 | 107,425 | 1,867.0 | 20,517.8 | 19,405.3 | 1.057 | 5.7 \% | 3.4 \% |
| 2001 | 112,142 | 2,048.6 | 21,979.7 | 21,283.6 | 1.033 | 3.3 \% | 1.6 \% |
| 2002 | 116,289 | 2,226.6 | 23,142.4 | 23,202.9 | 0.997 | 0.0 \% | 2.4 \% |
| 2003 | 121,582 | 2,364.7 | 25,071.9 | 24,724.0 | 1.014 | 1.4 \% | 1.9 \% |
| 2004 | 126,211 | 2,500.3 | 26,920.0 | 26,232.2 | 1.026 | 2.6 \% | 3.3 \% |
| 2005 | 131,674 | 2,691.4 | 28,575.3 | 28,359.7 | 1.008 | 0.8 \% | 3.4 \% |
| 2006 | 137,117 | 2,843.6 | 31,180.5 | 30,273.9 | 1.030 | 3.0 \% | 2.6 \% |
| 2007 | 142,906 | 3,075.3 | 35,050.1 | 32,877.5 | 1.066 | 6.6 \% | 4.1 \% |
| 2008 | 144,033 | 3,399.3 | 35,798.1 | 36,551.5 | 0.979 | (2.1)\% | 0.1 \% |
| 26-Year Average |  |  |  |  |  | 5.1 \% | 3.0 \% |
| 10-Year Average |  |  |  |  |  | 3.7 \% | 2.5 \% |

[^2]
## VARIABLE ANNUITIES <br> Comparative Statement 1983 THROUGH 2008

| Valuation Date | Number | \$ Millions |  |  | Ratio |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Annual Annuities | Fund Balance | Actuarial Reserve |  | Change in |  |
|  |  |  |  |  |  | Annuities | CPI* |
| 1983 | 13,598 | \$ 25.9 | \$ 289.4 | \$ 245.0 | 1.181 | 18.0 \% | 3.8 \% |
| 1984 | 14,520 | 34.2 | 329.2 | 327.5 | 1.005 | 0.0 \% | 4.0 \% |
| 1985 | 15,529 | 38.0 | 463.1 | 366.6 | 1.263 | 26.0 \% | 3.8 \% |
| 1986 | 16,276 | 51.8 | 538.7 | 498.6 | 1.080 | 8.0 \% | 1.1 \% |
| 1987 | 17,084 | 60.4 | 548.8 | 584.2 | 0.939 | (6.0)\% | 4.4 \% |
| 1988 | 17,779 | 61.4 | 682.6 | 594.0 | 1.149 | 14.0 \% | 4.4 \% |
| 1989 | 18,502 | 75.9 | 878.1 | 756.5 | 1.161 | 16.0 \% | 4.6 \% |
| 1990 | 19,922 | 101.0 | 868.6 | 1,013.4 | 0.857 | (14.0)\% | 6.2 \% |
| 1991 | 20,538 | 91.5 | 1,101.3 | 929.7 | 1.184 | 18.0 \% | 3.0 \% |
| 1992 | 20,968 | 112.6 | 1,208.6 | 1,147.4 | 1.053 | 5.0 \% | 3.0 \% |
| 1993 | 21,623 | 123.7 | 1,407.9 | 1,268.6 | 1.110 | 11.0 \% | 2.7 \% |
| 1994 | 22,248 | 144.6 | 1,418.0 | 1,487.0 | 0.954 | (4.0)\% | 2.7 \% |
| 1995 | 22,978 | 150.2 | 1,854.2 | 1,556.0 | 1.192 | 19.0 \% | 2.6 \% |
| 1996 | 23,725 | 189.8 | 2,264.9 | 1,976.7 | 1.146 | 14.0 \% | 3.3 \% |
| 1997 | 24,462 | 228.2 | 2,800.0 | 2,371.5 | 1.181 | 18.0 \% | 1.7 \% |
| 1998 | 25,424 | 289.5 | 3,400.5 | 3,035.5 | 1.120 | 12.0 \% | 1.6 \% |
| 1999 | 26,257 | 345.8 | 4,432.9 | 3,659.1 | 1.212 | 21.0 \% | 2.7 \% |
| 2000 | 27,321 | 445.3 | 4,211.4 | 4,749.3 | 0.887 | (11.0)\% | 3.4 \% |
| 2001 | 28,314 | 424.4 | 3,901.8 | 4,547.4 | 0.858 | (14.0)\% | 1.6 \% |
| 2002 | 28,662 | 374.0 | 2,899.3 | 3,999.1 | 0.726 | (27.0)\% | 2.4 \% |
| 2003 | 29,496 | 273.3 | 3,635.9 | 2,892.2 | 1.257 | 25.0 \% | 1.9 \% |
| 2004 | 30,270 | 346.0 | 3,909.9 | 3,654.5 | 1.070 | 7.0 \% | 3.3 \% |
| 2005 | 31,499 | 376.5 | 4,092.7 | 3,970.7 | 1.031 | 3.0 \% | 3.4 \% |
| 2006 | 32,683 | 391.8 | 4,594.2 | 4,145.2 | 1.108 | 10.0 \% | 2.6 \% |
| 2007 | 33,880 | 432.6 | 4,625.0 | 4,563.7 | 1.013 | 0.0 \% | 4.1 \% |
| 2008 | 34,927 | 427.0 | 2,574.5 | 4,491.0 | 0.573 | (42.0)\% | 0.1 \% |
| 26-Year Average |  |  |  |  |  | 3.4 \% | 3.0 \% |
| 10-Year Average |  |  |  |  |  | (5.1)\% | 2.5 \% |

* CPI percentage increase determined by ratio of current year CPI-U67 December index over prior year December index.



## Annuities Being Paid By Type <br> DECEMBER 31, 2008 <br> \$ MiLLIONS




# AnNuities Being Paid DEcember 31, 2008 TABULATED BY Year of Retirement (\$1,000S ANNUALLY) 

| Year <br> Ret'd | Core Annuities |  |  |  | Variable Annuities |  |  |  | Avg. Total Annuity |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | No. | Initial | Increases | Total | No. | Initial | Increases | Total |  |
| 2008 | 7,965 | \$ 219,104 | \$ 0 | \$ 219,105 | 2,045 | \$ 16,647 | \$ 0 | \$ 16,647 | \$29,598 |
| 2007 | 8,469 | 228,651 | 8,173 | 236,824 | 2,190 | 18,594 | 0 | 18,594 | 30,159 |
| 2006 | 8,250 | 206,709 | 17,231 | 223,940 | 1,997 | 17,770 | 1,777 | 19,547 | 29,514 |
| 2005 | 8,244 | 197,446 | 20,216 | 217,662 | 2,052 | 18,930 | 2,520 | 21,450 | 29,004 |
| 2004 | 7,397 | 165,148 | 20,116 | 185,264 | 1,864 | 16,995 | 3,607 | 20,602 | 27,831 |
| 2003 | 7,446 | 163,615 | 23,530 | 187,145 | 1,730 | 13,694 | 7,058 | 20,752 | 27,921 |
| 2002 | 7,015 | 140,705 | 21,149 | 161,854 | 1,552 | 17,969 | 1,917 | 19,886 | 25,907 |
| 2001 | 7,070 | 132,601 | 22,612 | 155,213 | 1,662 | 26,035 | $(1,260)$ | 24,775 | 25,458 |
| 2000 | 7,385 | 129,145 | 28,975 | 158,120 | 1,497 | 29,913 | $(4,584)$ | 25,329 | 24,841 |
| 1999 | 6,304 | 94,724 | 39,805 | 134,529 | 1,280 | 20,955 | 512 | 21,467 | 24,746 |
| 1998 | 6,260 | 87,868 | 45,462 | 133,330 | 1,302 | 18,719 | 2,759 | 21,478 | 24,730 |
| 1997 | 5,344 | 72,508 | 45,804 | 118,312 | 1,138 | 13,708 | 4,863 | 18,571 | 25,614 |
| 1996 | 5,390 | 70,930 | 52,880 | 123,810 | 1,169 | 12,214 | 6,618 | 18,832 | 26,464 |
| 1995 | 4,927 | 62,454 | 52,808 | 115,262 | 1,082 | 9,246 | 7,718 | 16,964 | 26,837 |
| 1994 | 4,455 | 53,721 | 49,387 | 103,108 | 1,063 | 9,041 | 6,907 | 15,948 | 26,724 |
| 1993 | 4,045 | 45,867 | 45,799 | 91,666 | 980 | 6,913 | 6,611 | 13,524 | 26,005 |
| 1992 | 3,500 | 38,020 | 41,323 | 79,343 | 846 | 5,726 | 6,041 | 11,767 | 26,032 |
| 1991 | 3,277 | 33,328 | 39,944 | 73,272 | 825 | 4,545 | 6,440 | 10,985 | 25,712 |
| 1990 | 5,227 | 56,561 | 73,651 | 130,212 | 1,409 | 8,907 | 9,672 | 18,579 | 28,466 |
| 1989 | 4,038 | 42,867 | 63,223 | 106,090 | 1,001 | 5,444 | 7,730 | 13,174 | 29,535 |
| 1988 | 3,226 | 27,084 | 44,978 | 72,062 | 848 | 3,708 | 6,516 | 10,224 | 25,507 |
| 1987 | 2,859 | 22,337 | 41,145 | 63,482 | 795 | 3,271 | 5,214 | 8,485 | 25,172 |
| 1986 | 2,618 | 19,761 | 41,058 | 60,819 | 734 | 2,836 | 5,103 | 7,939 | 26,264 |
| 1985 | 2,440 | 18,791 | 43,352 | 62,143 | 689 | 1,916 | 4,838 | 6,754 | 28,237 |
| 1984 | 1,961 | 14,016 | 34,994 | 49,010 | 600 | 1,659 | 4,193 | 5,852 | 27,976 |
| 1983 | 1,744 | 9,394 | 25,205 | 34,599 | 505 | 1,161 | 3,661 | 4,822 | 22,604 |
| 1982 | 1,368 | 6,039 | 18,046 | 24,085 | 386 | 718 | 2,706 | 3,424 | 20,109 |
| 1981 | 1,250 | 4,733 | 15,225 | 19,958 | 350 | 578 | 2,173 | 2,751 | 18,167 |
| 1980 | 958 | 3,133 | 10,372 | 13,505 | 272 | 354 | 1,695 | 2,049 | 16,235 |
| 1979 | 716 | 2,375 | 8,402 | 10,777 | 194 | 191 | 1,032 | 1,223 | 16,759 |
| 1978 | 613 | 1,720 | 6,328 | 8,048 | 188 | 160 | 935 | 1,095 | 14,914 |
| 1977 | 569 | 1,601 | 5,756 | 7,357 | 182 | 177 | 969 | 1,146 | 14,942 |
| 1976 | 467 | 1,181 | 4,496 | 5,677 | 129 | 86 | 521 | 607 | 13,458 |
| 1975 | 384 | 909 | 3,497 | 4,406 | 117 | 84 | 574 | 658 | 13,190 |
| 1974 | 214 | 628 | 2,439 | 3,067 | 75 | 51 | 314 | 365 | 16,039 |
| 1973 | 154 | 444 | 1,693 | 2,137 | 59 | 45 | 246 | 291 | 15,760 |
| 1972 | 109 | 241 | 966 | 1,207 | 31 | 21 | 105 | 126 | 12,234 |
| 1971 | 57 | 109 | 441 | 550 | 24 | 15 | 84 | 99 | 11,383 |
| 1970 | 50 | 102 | 418 | 520 | 16 | 8 | 47 | 55 | 11,494 |
| 1969 | 50 | 85 | 342 | 427 | 13 | 6 | 31 | 37 | 9,284 |
| Prior | 218 | 262 | 1,115 | 1,377 | 36 | 18 | 99 | 117 | 4,818 |
| Total | 144,033 | \$2,376,917 | \$1,022,356 | \$3,399,274 | 34,927 | \$309,028 | \$117,962 | \$426,990 | \$26,565 |

## Comparison of Actual to Expected Deaths Among Retired Lives (NORMAL RETIREMENT ONLY) <br> DURING 2008

| Age | Male Deaths |  |  | Female Deaths |  |  | Total Deaths |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Actual | Expected | Exposure | Actual | Expected | Exposure | Actual | Expected | Exposure |
| 30-34 |  |  |  |  |  | 1 |  |  | 1 |
| 35-39 |  |  |  |  |  | 6 |  |  | 6 |
| 40-44 |  |  |  |  |  | 19 |  |  | 19 |
| 45-49 |  |  | 13 |  |  | 76 |  |  | 89 |
| 50-54 | 2 | 2 | 825 | 3 |  | 464 | 5 | 2 | 1,289 |
| 55-59 | 24 | 40 | 6,877 | 20 | 30 | 8,264 | 44 | 70 | 15,141 |
| 60-64 | 96 | 100 | 12,913 | 60 | 75 | 14,674 | 156 | 175 | 27,587 |
| 65-69 | 125 | 163 | 12,516 | 118 | 110 | 14,171 | 243 | 273 | 26,687 |
| 70-74 | 174 | 229 | 9,976 | 160 | 159 | 11,644 | 334 | 388 | 21,620 |
| 75-79 | 290 | 349 | 8,175 | 223 | 231 | 9,590 | 513 | 580 | 17,765 |
| 80-84 | 394 | 416 | 5,653 | 315 | 340 | 7,734 | 709 | 756 | 13,387 |
| 85-89 | 376 | 373 | 3,022 | 469 | 449 | 5,443 | 845 | 822 | 8,465 |
| 90-94 | 198 | 211 | 1,045 | 408 | 390 | 2,707 | 606 | 601 | 3,752 |
| 95-99 | 66 | 61 | 220 | 241 | 188 | 835 | 307 | 249 | 1,055 |
| 100\&Up | 9 | 6 | 17 | 39 | 50 | 139 | 48 | 56 | 156 |
| Totals | 1,754 | 1,950 | 61,252 | 2,056 | 2,022 | 75,767 | 3,810 | 3,972 | 137,019 |
| Average |  |  |  |  |  |  |  |  |  |
| Ages | 80.5 | 79.7 | 69.6 | 84.1 | 83.6 | 71.1 | 82.4 | 81.7 | 70.4 |

## SECTION E

APPENDIX

## Actuarial Assumptions Used in the <br> Retired Life Actuarial Valuation

The interest rate used in the valuation was $5.0 \%$ a year, compounded yearly, as provided in Section 40.02 of the Wisconsin Statutes. The mortality table used in the valuation was the Wisconsin Projected Experience Mortality Table-2005, as adopted by the Board in connection with the 2002-2005 Experience Study. In addition, retired life liabilities in the valuations contain a reserve for mortality improvement. The reserve level used in this valuation was $1.5 \%$.

## Single Life Retirement Values

Wisconsin Projected Experience Table - 2005 with 5\% Interest

| Sample <br> Attained <br> Ages | Present Value of \$1 <br> Monthly for Life |  | Future Life <br> Expectancy (years) |  | Probability of Death <br> Next Year |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Males | Females | Males | Females | Males | Females |
|  |  |  |  |  |  |  |
| 40 | $\$ 205.69$ | $\$ 213.54$ | 40.9 | 45.3 | $0.109 \%$ | $0.057 \%$ |
| 50 | 196.14 | 205.53 | 36.2 | 40.5 | $0.161 \%$ | $0.089 \%$ |
| 55 | 184.61 | 195.62 | 31.5 | 35.7 | $0.263 \%$ | $0.123 \%$ |
|  | 171.16 | 183.60 | 27.0 | 30.9 | $0.463 \%$ | $0.256 \%$ |
| 60 |  |  |  |  |  |  |
| 65 | 155.69 | 169.88 | 22.7 | 26.4 | $0.675 \%$ | $0.435 \%$ |
| 70 | 137.31 | 153.66 | 18.5 | 22.0 | $1.036 \%$ | $0.665 \%$ |
| 75 | 116.87 | 134.71 | 14.5 | 17.8 | $1.816 \%$ | $1.065 \%$ |
|  | 95.20 | 113.77 | 11.0 | 13.9 | $3.340 \%$ | $1.950 \%$ |
| 80 |  |  |  |  |  |  |
| 85 | 74.62 | 91.62 | 8.1 | 10.4 | $6.031 \%$ | $3.387 \%$ |
|  | 55.95 | 69.69 | 5.7 | 7.4 | $10.268 \%$ | $6.512 \%$ |

The values shown above are for non-disabled participants. Sample values for disabled participants are as follows:

| Sample <br> Attained <br> Ages | Present Value of \$1 <br> Monthly for Life |  | Future Life <br> Expectancy (years) |  | Probability of Death <br> Next Year |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Males | Females | Males | Females | Males | Females |
|  |  |  |  |  |  |  |
| 40 | $\$ 188.17$ | $\$ 200.45$ | 33.0 | 38.1 | $0.262 \%$ | $0.131 \%$ |
| 45 | 175.49 | 189.75 | 28.5 | 33.4 | $0.386 \%$ | $0.205 \%$ |
| 50 | 160.60 | 176.73 | 24.1 | 28.7 | $0.631 \%$ | $0.282 \%$ |
| 55 | 144.08 | 161.35 | 20.0 | 24.2 | $1.112 \%$ | $0.589 \%$ |
|  |  |  |  |  |  |  |
| 60 | 126.15 | 144.83 | 16.2 | 20.1 | $1.620 \%$ | $1.000 \%$ |
| 65 | 105.47 | 126.05 | 12.5 | 16.1 | $2.485 \%$ | $1.529 \%$ |
| 70 | 83.80 | 104.95 | 9.3 | 12.4 | $4.358 \%$ | $2.450 \%$ |
| 75 | 62.40 | 83.07 | 6.5 | 9.1 | $8.016 \%$ | $4.485 \%$ |
| 80 |  |  |  |  |  |  |
| 85 | 44.25 | 61.62 | 4.3 | 6.3 | $14.473 \%$ | $7.789 \%$ |
|  | 29.47 | 42.01 | 2.8 | 4.1 | $24.643 \%$ | $14.977 \%$ |

## Post-Retirement Adjustments

## Core Annuities - 40.27(2)

"Core Annuity Reserve Surplus Distributions. Surpluses in the core annuity reserve established under s. 40.04(6) and (7) shall be distributed by the board if the distribution will result in at least a $0.5 \%$ increase in the amount of annuities in force, on recommendation of the actuary, as follows:
(a) The distributions shall be expressed as percentage increases in the amount of the monthly annuity in force, including prior distributions of surpluses but not including any amount paid from funds other than the core annuity reserve fund, preceding the effective date of the distribution. For purposes of this subsection, annuities in force include any disability annuity suspended because the earnings limitation had been exceeded by that annuitant in that year.
(b) Prorated percentages based on the annuity effective date may be applied to annuities with effective dates during the calendar year preceding the effective date of the distribution, as provided by rule, but no other distinction may be made among the various types of annuities payable from the core annuity reserve.
(c) The distributions shall not be offset against any other benefit being received but shall be paid in full, nor shall any other benefit being received be reduced by the distributions. The annuity reserve surplus distributions authorized under this subsection may be revoked by the board in part or in total as to future payments upon recommendation of the actuary if a deficit occurs in the core annuity reserves."

## Variable Annuities - 40.28(2)

"Whenever the balance in the variable annuity reserve, as of December 31 of any year, exceeds or is less than the then present value of all variable annuities in force, determined in accordance with the rate of interest and approved actuarial tables then in effect, by at least $2 \%$ of the present value of all variable annuities in force, the amount of each variable annuity payment shall be proportionately increased or decreased, disregarding fractional percentages, and effective on a date determined by rule, so as to reduce the variance between the balance of the variable annuity reserve and the present value of variable annuities to less than one percent."

## NARRATIVE REGARDING THE DEVELOPMENT OF DIVIDEND AND Variable Annuity Changes Shown on Pages 6 And 15

## 1. SWIB Published Investment Return

The earnings rate published by State of Wisconsin Investment Board on the Core/Variable Fund.
2. Adjustment to Relate Earnings to Averaged Core/Variable Annuity Balance

Item 3 below minus Item1 above. For core annuities, this is the MRA adjustment which takes into account five-year smoothing of gains and losses. For variable annuities, it converts a figure based on an average balance to a figure based on a beginning year balance.

## 3. Published Earnings Rate

The earnings rate published by DETF is funds' earnings credits expressed as a percentage of the beginning year balance adjusted for benefit payments and reserve transfers.
4. Adjustment to Relate Earnings to Averaged Core Annuity Balance

Item 5 below minus Item 3 above.
5. Earnings Rate Based on Average Balance

This is similar to the published earnings rate except that the rate is determined as a percentage of the average balance during the year instead of the adjusted beginning of year balance.

## 6. Expected Dividend (Variable Change) before Adjustments

The relative difference in fund growth based on actual versus the $5 \%$ assumed earnings rates.

## 7. Adjustment to Relate Average Asset to Ending Liability

The final dividend/variable change is calculated based on the end of year assets divided by the end of year liabilities. Since the calculations in Items 5 and 6 are based on average (approximately mid-year) balances, this adjustment is needed so that the final rate will be based on the end of year liabilities.
8. Carryover from Last Year Due to Timing of Distribution and Accounting Adjustments (and Truncation for Variable Annuity)

The dividend or variable rate changes are made effective April 1 of each year. This adjustment takes into account the fact that the prior year dividend/variable increase was in effect for less than a full year as well as any accounting adjustments made to the asset value at the beginning of the year. This adjustment also carries over any truncated or rounded amounts from the prior year.

## NARRATIVE REGARDING THE DEVELOPMENT OF DIVIDEND AND VARIABLE ANNUITY CHANGES SHOWN ON PAGES 6 AND 15

## 9. Adjustments to Contingency Reserve and Data Reserve

Currently there is a reserve for incomplete data for the dividend calculation of $0.2 \%$ and a mortality improvement reserve for both the dividend and variable calculations that starts at $0.5 \%$ and grades to $1.5 \%$ over a 3 -year experience period. The adjustment is equal to the amount held in reserve for the current year less the amount held in reserve for the prior year expressed as a percent of the end of year liability. This reserve is accumulated to reflect the fact that over time, mortality rates tend to improve. By increasing reserves gradually each year, instead of all at once every three years, the effect on dividends and variable increases will also be more gradual.

## 10. Experience Study

A study is conducted for WRS every three years to analyze the assumptions that are made in the valuation versus the experience that actually occurred. If the results of the study show material changes in experience, WRS generally adopts a new set of assumptions. When assumptions are changed, this item displays the effect of the change on the dividend/variable rate calculation.

## 11. Experience and Other Effects

After making all other known adjustments, this is the remainder of all other experience. Changes here are primarily attributable to mortality experience and, generally to a lesser extent, on any data adjustments.

## 12. Statutory Adjustment to Round/Truncate

By statute, the dividend rate is calculated to the nearest one-tenth of a percent. For the variable annuity change, the rate is truncated to a whole percent. This is the adjustment made from the calculated dividend/variable annuity rate change without rounding/truncation to the statutory rate.

## 13. Computed Dividend Rate/Variable Annuity Change.

This is the end of year asset value divided by the end of year liability. It is reconciled to the published earnings rate (Item 3) by making the adjustments in Items 6 through 12.

March 3, 2009

Mr. David Stella
Wisconsin Department of Employee Trust Funds
801 W. Badger Road
Madison, Wisconsin 53713-2526

## Re: Retired Life Actuarial Valuation

Dear Dave:
Enclosed are 40 copies of the report of the December 31, 2008 Retired Lives Actuarial Valuation with the remaining 35 copies to follow under separate cover tomorrow.

## Sincerely,



Mark Buis
MB:lr
Enclosures


[^0]:    WISCONSIN RETIREMENT SYSTEM
    $26^{\text {TH }}$ ANNUAL ACTUARIAL VALUATION OF RETIRED LIVES DECEMBER 31, 2008

[^1]:    * Certain Only category consists of continuations of 5, 10 and 15 -year certain and life annuities to beneficiaries of deceased annuitants.

[^2]:    * CPI percentage increase determined by ratio of current year CPI-U67 December index over prior year December index.
    ** Including 10.6\% Act 11 transfer.

