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## Correspondence Memorandum

**Date:** March 14, 2016  
**To:** Employee Trust Funds Board  
**From:** Robert C. Willett, Chief Trust Finance Officer  
**Subject:** December 31, 2015 Actuarial Valuation of Retired Lives

**Staff requests the Employee Trust Funds Board (Board) approve the report, 33<sup>rd</sup> Annual Actuarial Valuation of Retired Lives as of December 31, 2015.**

Gabriel Roeder Smith & Company (GRS) has completed the actuarial valuation of Wisconsin Retirement System retired lives as of December 31, 2015. This valuation determines the amounts to be transferred from member and employer accounts to fund 2015 new annuities, and the amount available to provide increases for existing Core and Variable annuities.

GRS is recommending that Core annuities be increased by 0.5%. This is based on the 6.4% effective rate interest credited to the core annuity reserve and mortality experienced during the last year. The increase will be applied to all core annuities except those originating in 2015 which will receive a prorated increase.

Variable annuities will be decreased by 5.0%. This is based on the 0% effective rate interest credited to the variable annuity reserve and mortality experienced during the last year. The variable annuity decrease will be applied equally to all variable annuities, regardless of the effective date.

Core increases and variable decreases will first be included on May 1, 2016 annuity payments.

Actuaries from GRS will be at the Board meeting to present the report and answer questions.

Attachment: 33<sup>rd</sup> Annual Actuarial Valuation of Retired Lives

Reviewed and approved by Robert J. Conlin, Secretary

Electronically Signed: 3/15/2016

Board	Mtg Date	Item #
ETF	3.24.16	5A

**WISCONSIN RETIREMENT SYSTEM**  
**33<sup>RD</sup> ANNUAL ACTUARIAL VALUATION OF RETIRED LIVES**  
**DECEMBER 31, 2015**

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Variable Annuity Changes

March 14, 2016

Employee Trust Funds Board  
Madison, Wisconsin

Ladies and Gentlemen:

The results of the **33rd annual actuarial valuation of core and variable annuities** being paid from the Wisconsin Retirement System are presented in this report. This report should not be relied on for any other purpose.

The date of this valuation was December 31, 2015. Actuarial assumptions used in the valuation are summarized in the Appendix.

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

	<b>Core</b>	<b>Variable</b>
Number of Annuitants	191,795	40,152
Annual Amount	\$ 4,364.9	\$ 387.8
Fund Balance	49,147.0	3,704.8
Actuarial Reserve	48,897.5	3,910.1
<b>Ratio</b>	<b>1.005</b>	<b>0.947</b>

**Based upon these results, the increase in the core annuities is 0.5% and variable annuities will be decreased by 5%.**


This report was prepared at the request of the Wisconsin Retirement System and those designated or approved by the Wisconsin Retirement System. This report may be provided to parties other than the Wisconsin Retirement System only in its entirety and only with the permission of the Wisconsin Retirement System. The valuation was based upon data furnished by the WRS staff, concerning Fund assets and individual annuitants and beneficiaries. Data was checked for internal consistency, but was not otherwise audited. We are not responsible for the accuracy or completeness of the information provided by the Wisconsin Retirement System.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements; and changes in plan provisions or applicable law.

To the best of our knowledge this report is complete and accurate. All calculations have been made in conformity with generally accepted actuarial principles and practices and with the Actuarial Standards of Practice issued by the Actuarial Standards Board. Brian B. Murphy, Mark Buis and James D. Anderson are all Members of the American Academy of Actuaries (MAAA) and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein. The signing actuaries are independent of the plan sponsor.

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

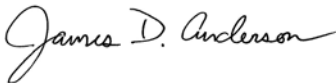
Respectfully submitted,



Brian B. Murphy, FSA, EA, FCA, MAAA



Mark Buis, FSA, EA, FCA, MAAA



James D. Anderson, FSA, EA, MAAA

BBM/MB/JDA:ah

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## **SECTION A**

### **EXECUTIVE SUMMARY**

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## EXECUTIVE SUMMARY

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### 1. Retiree Dividend in Core Annuities

The Core annuity fund return (after applying the five year smoothing method under the Market Recognition Account) of 6.4% exceeds the 5.0% assumed investment return threshold that triggers an annuity adjustment. This valuation determined the amount of available surplus. The available surplus in the core fund is \$249.5 million as of December 31, 2015. After adjusting for expected improvements in longevity and various other items (described in detail on page 7), **the result is a 0.5% increase in benefits.**

### 2. Change in Variable Annuities

The variable fund effective earnings rate was 0% resulting in a deficit of \$205.3 million. The deficit of \$205.3 million will **result in a 5% decrease in all variable annuities in force.**

### 3. General Comments

Due to the asset smoothing method used in the core annuity fund, there are approximately \$3 billion in unrecognized asset losses as of December 31, 2015 which will be recognized over the next four years. Although only half of this applies to the annuitant reserve, this will put downward pressure on dividends being granted over the next few years.

The value of previously granted dividends is approximately \$5.5 billion. It is important that the value of dividend payments continue to build up in order to avoid the possibility of leveraged negative adjustments in the future. This will happen naturally as long as investments in the core fund attain the long term investment goal of 7.2%.

## EXECUTIVE SUMMARY

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The mortality table used to value liabilities was updated in connection with the 2012-2014 Experience Study. The study indicated the members are living longer. The impact of the change in mortality resulted in an increase in liabilities of approximately 1.67% which will be recognized in equal increments over the next 3 years.

**Conclusion.** In accordance with the Administrative Code, ETF 20.25, Section 40.27(2) and Section 40.28(2) of the Wisconsin Statutes:

Core annuities will be increased by 0.5%, and  
Variable annuities will be decreased by 5%.



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**SECTION B**  
**OPERATION OF THE SYSTEM**

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## **OPERATION OF THE RETIREMENT SYSTEM**

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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 real 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

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The Wisconsin Retirement System (WRS) 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.

**In calculating both the dividend for the Core annuities and the adjustment for Variable annuities, a 5.0% assumed investment return is used to fund the original benefit. Only returns in excess of 5.0% can produce an increase in a member's annuity. Returns below 5% result in a decrease. Please see page 30 for a full description of these benefits.**

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**SECTION C**  
**CORE ANNUITIES**

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**CORE ANNUITY DIVISION**  
**DEVELOPMENT OF ASSETS AND LIABILITIES**

	\$ Millions		Ratio
	Assets	Liabilities	
<b>Ending Balance December 31, 2014</b>	\$47,135.7	\$45,790.7	1.029
Closing Adjustments	(0.5)	0.0	
Variable Terminations	90.1	90.1	
2015 Core Annuity Average Adjustment: 2.9%	0.0	1,261.4	
<b>Beginning Balance January 1, 2015</b>	47,225.3	47,142.2	1.002
<b>Increases</b>			
Reserve Transfers	3,449.3	3,449.3	
Regular Interest	2,334.0	2,334.0	
Additional Earnings	519.1	0.0	
Addition for Experience Study/Mortality Reserve	0.0	276.3	
Other	0.0	76.4	
<b>Total Increases</b>	6,302.4	6,136.0	
<b>Decreases</b>			
Annuities & Lump Sums	4,380.7	4,380.7	
Credit Re-establishments	0.0	0.0	
Subtraction for Experience Study/Mortality Reserve	0.0	0.0	
Other	0.0	0.0	
<b>Total Decreases</b>	4,380.7	4,380.7	
<b>Ending Balance December 31, 2015</b>	<b>\$49,147.0</b>	<b>\$48,897.5</b>	<b>1.005</b>

The ending liability balance includes a data reserve of \$48.8 million and a liability for previously granted dividends of \$5,525 million (prior to any 2016 adjustments).

## **RESERVE TRANSFER RECOMMENDATION**

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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 \$3,427,886,239. Adjustments to prior transfers, related to estimated annuities for which final computations have now been made, totaled \$21,374,199. Reserve transfers are distributed as follows:

<b>Group</b>	<b>Regular Transfer</b>	<b>Adjustment to Prior Transfer</b>	<b>Total Transfer</b>
General	\$2,933,128,288	\$18,558,293	\$2,951,686,581
Protective with Social Security	361,990,998	1,062,170	363,053,168
Protective without Social Security	96,249,024	847,807	97,096,831
Executive & Elected	36,517,930	905,928	37,423,858
<b>Totals</b>	<b>\$3,427,886,239</b>	<b>\$21,374,199</b>	<b>\$3,449,260,438</b>

Accordingly, we recommend that \$3,449,260,438 be transferred to the Core Annuity Reserve. The results in this report assume that this transfer has been made.

## DISCUSSION OF DIVIDEND

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The Core Annuity Fund balance, \$49,147.0 million, was greater than the actuarial present value of core annuities and reserves, \$48,897.5 million, by \$249.5 million which resulted in an annuity adjustment of 0.5%. The primary sources of the 0.5% adjustment are:

	<u>% of APV</u>
1. SWIB published investment return	(0.40)%
2. MRA adjustment	<u>6.80%</u>
3. Published effective earnings rate	6.40%
4. Adjustment to relate earnings to average core annuity fund balance	<u>(0.30)%</u>
5. Earnings rate based on average balance	6.10%
6. Expected dividend before adjustments: 1.061/1.05-1	1.05%
7. Adjustment to relate average asset to ending liability	0.01%
8. Carryover from last year due to timing of dividend accounting adjustments and rounding	0.17%
9. Experience study/mortality reserve adjustment	(0.57)%
10. Experience and other effects	(0.15)%
11. Statutory adjustment to round to nearest one-tenth percent	<u>(0.01)%</u>
<b>12. Computed average dividend rate: (6)+(7)+(8)+(9)+(10)+(11)</b>	<b>0.5%</b>
13. Adjustment for members at or near the statutory floor	0.0%
<b>14. Final maximum computed dividend rate: (12)+(13), if greater than 0.5% of core annuities, otherwise 0%</b>	<b>0.5%</b>

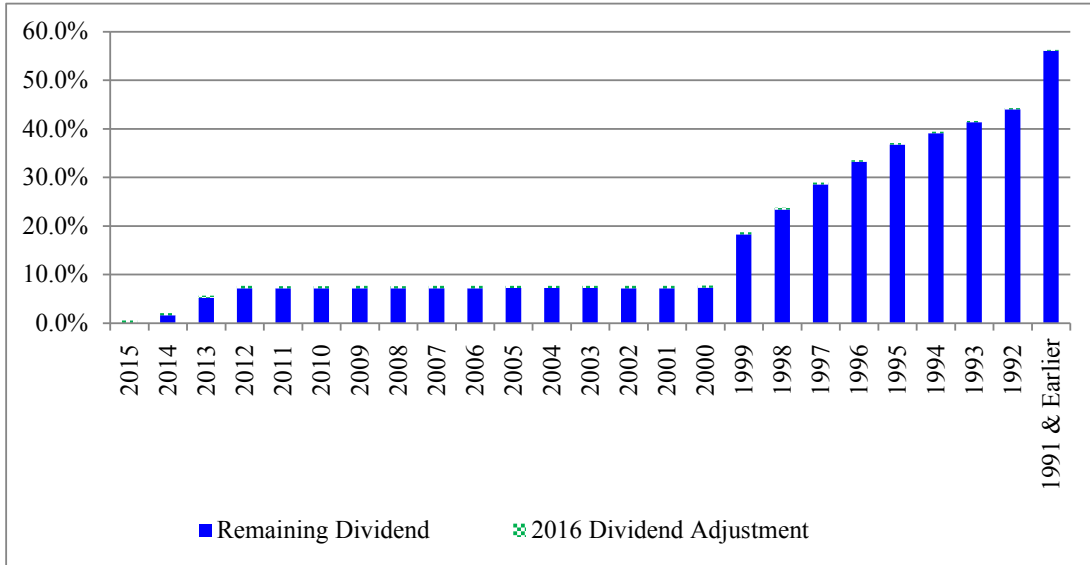
**See pages 31 and 32 for a description of items on this page.**

In accordance with the Administrative Code, ETF 20.25 and Section 40.27(2) Wisconsin Statutes (see page 30), the dividend adjustment is 0.5% effective April 1, 2016.

## DISCUSSION OF DIVIDEND

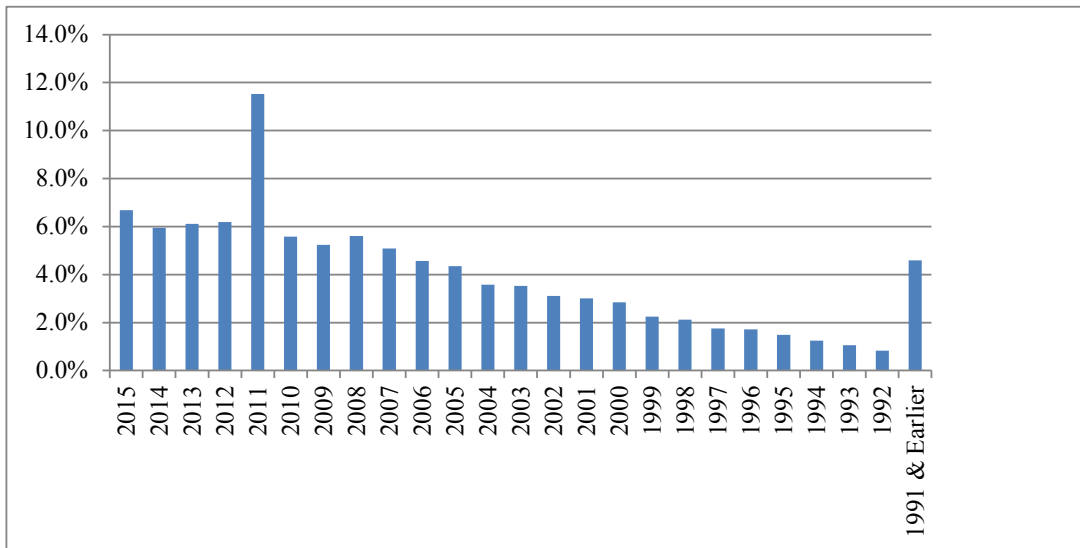
As shown on the prior page, the adjustment for all core fund members is 0.5%. This is the third positive dividend adjustment since 2008, and will be spread equally over all annuitants as shown in the chart below.

### Dividend Remaining (as a Percentage of Total Benefit) by Year of Retirement



After the 2016 dividend adjustment, members retired prior to 2000 continue to have the highest dividend remaining as a percentage of total benefit and also represent a shrinking portion of the liabilities. The chart below shows liabilities by year of retirement.

### Liabilities (as a Percentage of Total) by Year of Retirement



Looking ahead, a few years of spreading positive dividends over all annuitants is needed to decrease the probability of leveraged negative dividends that occurred between 2008 and 2012. Over this period, the liability for dividends decreased from about \$9.2 billion to \$3.0 billion. The value of previously granted dividends is approximately \$5.5 billion. However, there are currently about \$3 billion in unrecognized assets losses that will be recognized over the next four years, about half of which will be applied to the annuitant reserve.



**TRANSFERS TO ANNUITY RESERVE  
TO FINANCE CORE ANNUITIES APPROVED IN 2015  
TABULATED BY TYPE OF ANNUITY AND OPTION**

Alpha Code	Type of Benefit	Number	Annual Amount	Present Value
<b>REGULAR RETIREMENT</b>				
SL	Straight Life	1,538	\$ 30,257,147	\$ 410,587,031
SL	Straight Life (accelerated)	0	4,408,230	15,429,990
A60	Life Annuity with 60 payments guaranteed	888	18,679,581	256,025,145
A60	Life Annuity with 60 payments guaranteed (accelerated)	0	3,251,768	11,088,836
A180	Life Annuity with 180 payments guaranteed	1,931	37,502,591	538,656,122
A180	Life Annuity with 180 payments guaranteed (accelerated)	0	8,078,821	30,699,323
JOINT	Joint and 75% Survivor	917	22,917,549	347,265,993
JOINT	Joint and 75% Survivor (accelerated)	0	3,862,595	14,043,171
R25	Reduced 25% on First Death	426	12,187,729	175,149,229
R25	Reduced 25% on First Death (accelerated)	0	1,607,453	5,509,667
C100	100% Continued to Named Survivor	1,116	23,370,648	359,057,780
C100	100% Continued to Named Survivor (accelerated)	0	3,550,350	12,421,877
C180	100% Continued to Named Survivor with 180 payments guaranteed	3,052	71,258,711	1,116,770,540
C180	100% Continued to Named Survivor with 180 payments guaranteed (accelerated)	0	15,326,260	60,092,028
AC24	Annuity Certain with 24 Payments	2	211,517	462,186
AC60	Annuity Certain with 60 Payments	1	122,020	549,689
AC120	Annuity Certain with 120 Payments	3	34,286	274,107
AC180	Annuity Certain between 24 and 180 Payments	4	169,503	919,551
SLNSD	Straight Life - Named Survivor Deceased	3	72,225	908,879
	Total Regular	9,881	\$ 256,868,984	\$ 3,355,911,144
	Average Age at Retirement	61.1 Years		
<b>DISABILITY RETIREMENT</b>				
SL	Straight Life	20	\$ 561,721	\$ 7,924,706
A60	Life Annuity with 60 payments guaranteed	12	328,712	4,328,393
A180	Life Annuity with 180 payments guaranteed	19	490,655	6,777,187
JOINT	Joint and 75% Survivor	12	481,563	7,637,494
R25	Reduced 25% on First Death	1	31,858	469,105
C100	100% Continued to Named Survivor	12	373,515	5,905,002
C180	100% Continued to Named Survivor with 180 payments guaranteed	48	1,576,379	25,614,710
	Total Disability	124	\$ 3,844,403	\$ 58,656,597
	Average Age at Retirement	55.7 Years		
<b>DEATH-IN-SERVICE BENEFITS</b>				
SL	Straight Life	18	\$ 205,839	\$ 3,173,322
SL	Straight Life (accelerated)	0	39,618	139,658
A60	Life Annuity with 60 payments guaranteed	2	66,502	750,464
A180	Life Annuity with 180 payments guaranteed	36	561,999	8,034,868
A180	Life Annuity with 180 payments guaranteed (accelerated)	0	22,800	49,525
LOL	Life with Optional Length Guaranteed	1	129,849	1,170,661
	Total Death-in-Service	57	\$ 1,026,607	\$ 13,318,498
	Average Age at Retirement	54.8 Years		
<b>GRAND TOTAL</b>		<b>10,062</b>	<b>\$ 261,739,994</b>	<b>\$ 3,427,886,239</b>

*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 TABULATED BY TYPE OF ANNUITY AND OPTION

Alpha Code	Type of Benefit	Number	Annual Amount	Present Value
<b>REGULAR RETIREMENT</b>				
SL	Straight Life	25,184	\$ 495,183,851	\$ 5,356,699,281
SL	Straight Life (accelerated)	0	21,466,157	49,058,674
A60	Life Annuity with 60 payments guaranteed	20,293	397,715,425	4,083,218,747
A60	Life Annuity with 60 payments guaranteed (accelerated)	0	14,956,883	32,823,436
A120	Life Annuity with 120 payments guaranteed	88	1,114,089	3,154,786
A180	Life Annuity with 180 payments guaranteed	37,727	711,282,160	7,693,644,366
A180	Life Annuity with 180 payments guaranteed (accelerated)	0	40,320,544	98,842,627
A180F	Life Annuity with 180 payments guaranteed (forced)	283	2,105,567	18,400,887
JOINT	Joint and 75% Survivor	21,732	539,231,820	6,361,947,566
JOINT	Joint and 75% Survivor (accelerated)	0	21,077,221	47,461,872
R25	Reduced 25% on First Death	14,009	379,452,312	3,857,820,459
R25	Reduced 25% on First Death (accelerated)	0	8,464,206	19,962,381
C100	100% Continued to Named Survivor	17,395	367,695,701	4,523,815,249
C100	100% Continued to Named Survivor (accelerated)	0	17,663,717	42,010,850
C180	100% Continued to Named Survivor with 180 payments guaranteed	46,395	1,090,582,851	14,604,449,801
C180	100% Continued to Named Survivor with 180 payments guaranteed (accelerated)	0	76,868,480	189,942,144
LOL	Life with Optional Length Guaranteed	49	763,632	3,532,697
LOLF	Life with Optional Length Guaranteed (Forced)	3	74,798	212,760
AC24	Annuity Certain with 24 Payments	6	237,540	392,979
AC60	Annuity Certain with 60 Payments	7	667,855	1,617,770
AC120	Annuity Certain with 120 Payments	11	1,171,411	5,226,604
AC180	Annuity Certain between 24 and 180 Payments	12	2,080,676	9,351,002
C50	50% Continued to One Beneficiary	41	582,078	2,072,626
C50W180	50% Continued to One Beneficiary with 180 Months guaranteed	5	32,609	94,936
C75WSS	75% Continued to One Beneficiary and Social Security Integrated	60	1,234,256	6,043,757
R25W120	Reduced 25% on Death of Annuitant or Named Survivor with 120 Months guaranteed	3	42,608	115,403
A60WSS	Life with 60 Months Guaranteed and Social Security Integrated	73	462,748	1,425,641
A180WSS	Life with 180 Months Guaranteed and Social Security Integrated	76	1,521,090	5,244,778
PF6213	Police and Firemen s.62.13 *	77	2,422,961	9,085,748
SLNSD	Straight Life - Named Survivor Deceased	651	17,327,331	172,376,112
Total Regular		184,180	\$4,213,802,577	\$47,200,045,939

(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 TABULATED BY TYPE OF ANNUITY AND OPTION

Alpha Code	Type of Benefit	Number	Annual Amount	Present Value
<b>DISABILITY RETIREMENT</b>				
SL	Straight Life	756	\$ 18,990,042	\$ 188,566,775
A60	Life Annuity with 60 payments guaranteed	421	10,214,896	97,576,515
A180	Life Annuity with 180 payments guaranteed	1,106	25,524,332	266,997,301
JOINT	Joint and 75% Survivor	521	10,991,698	121,958,509
R25	Reduced 25% on First Death	222	4,721,837	50,333,701
C100	100% Continued to Named Survivor	1,245	21,355,413	239,897,540
C180	100% Continued to Named Survivor with 180 payments guaranteed	1,986	39,649,246	517,767,945
DWSMC	Disability with Spouse or Minor/Dependent Child	23	509,936	4,071,190
DWOSMC	Disability without Spouse or Minor/Dependent Child	2	39,575	302,898
PF6213	Police and Firemen s.62.13 *	16	300,193	1,235,388
SLNSD	Straight Life - Named Survivor Deceased	7	184,294	1,857,573
Total Disability		6,305	\$ 132,481,462	\$ 1,490,565,335
<b>DEATH-IN-SERVICE BENEFITS</b>				
SL	Straight Life	252	\$ 3,297,976	\$ 35,256,187
SL	Straight Life (accelerated)	0	118,595	356,507
A60	Life Annuity with 60 payments guaranteed	133	2,189,447	23,356,723
A60	Life Annuity with 60 payments guaranteed (accelerated)	0	58,272	216,795
A180	Life Annuity with 180 payments guaranteed	889	11,871,509	143,184,319
A180	Life Annuity with 180 payments guaranteed (accelerated)	0	784,928	2,473,790
C180	100% Continued to Named Survivor with 180 payments guaranteed	2	10,523	156,706
LOL	Life with Optional Length Guaranteed	5	190,926	1,450,696
AC180	Annuity Certain between 24 and 180 Payments	1	15,883	11,339
A60WSS	Life with 60 Months Guaranteed and Social Security Integrated	26	29,730	126,143
PF6213	Police and Firemen s.62.13 *	2	59,132	254,599
Total Death-in-Service		1,310	\$ 18,626,921	\$ 206,843,804
<b>GRAND TOTAL</b>		<b>191,795</b>	<b>\$4,364,910,960</b>	<b>\$48,897,455,078</b>

*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.*

### \*Additional Information for Police and Firemen 62.13 Annuities

	Regular Retirement			Disability Retirement			Death-in-Service Retirement		
	Original	Dividends	Total	Original	Dividends	Total	Original	Dividends	Total
<b>Benefit Amount</b>	659,926	1,763,035	2,422,961	70,581	229,612	300,193	14,477	44,655	59,132
<b>Present Value</b>	2,515,418	6,570,330	9,085,748	291,187	944,201	1,235,388	62,320	192,278	254,599

**CORE ANNUITIES BEING PAID  
TABULATED BY ATTAINED AGES**

Attained Ages	Regular		Disability		Death-in-Service		Totals	
	No.	Annual Amount	No.	Annual Amount	No.	Annual Amount	No.	Annual Amount
Under 20	0	\$ 0	3	\$ 23,435	5	\$ 51,863	8	\$ 75,298
20-24	0	0	3	37,064	14	87,073	17	124,137
25-29	0	0	10	76,340	18	99,782	28	176,122
30-34	0	0	14	95,919	19	131,448	33	227,367
35-39	2	17,919	20	157,810	27	212,968	49	388,697
40-44	7	45,962	18	186,317	29	178,682	54	410,961
45-49	63	583,002	95	2,299,805	42	377,698	200	3,260,505
50-54	1,155	32,747,238	347	9,208,565	68	841,384	1,570	42,797,187
55-59	12,926	382,336,035	757	18,869,412	141	2,361,719	13,824	403,567,166
60-64	32,924	866,866,975	1,235	28,194,417	199	3,475,069	34,358	898,536,461
65-69	46,721	1,075,410,392	1,234	26,357,936	205	3,564,023	48,160	1,105,332,351
70-74	33,229	707,662,855	943	18,737,411	150	2,478,871	34,322	728,879,137
75-79	22,906	462,215,500	721	13,475,016	113	1,457,283	23,740	477,147,799
80-84	16,298	334,667,616	511	8,684,858	90	1,030,827	16,899	344,383,301
85-89	10,642	218,716,601	272	4,365,150	84	1,155,396	10,998	224,237,147
90-94	4,666	89,588,790	107	1,444,052	48	600,466	4,821	91,633,308
95& Up	1,486	22,745,413	15	267,955	21	101,922	1,522	23,115,290
Certain Only*	1,155	20,198,279	0	0	37	420,447	1,192	20,618,726
<b>Totals</b>	<b>184,180</b>	<b>\$4,213,802,577</b>	<b>6,305</b>	<b>\$132,481,462</b>	<b>1,310</b>	<b>\$18,626,921</b>	<b>191,795</b>	<b>\$4,364,910,960</b>

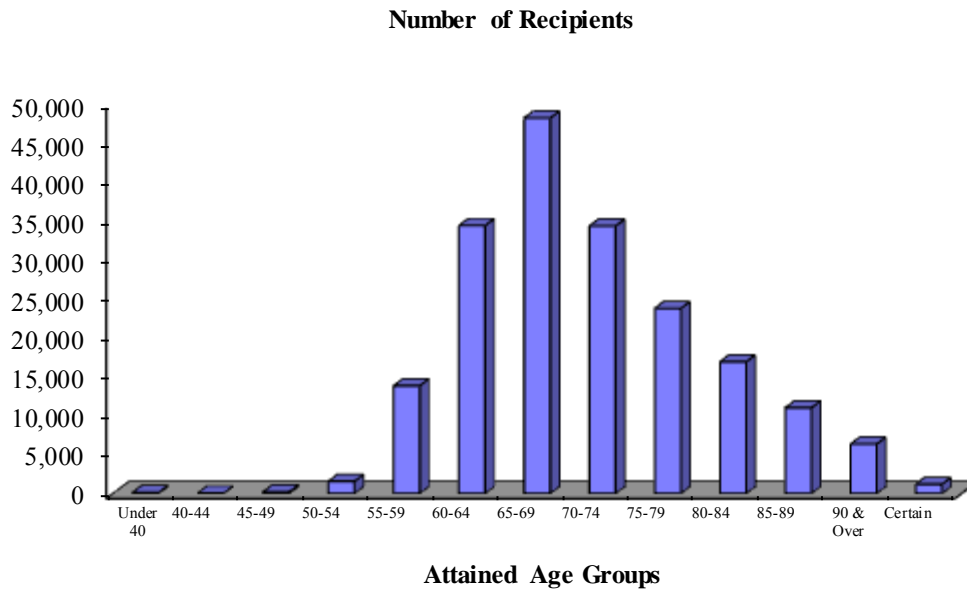
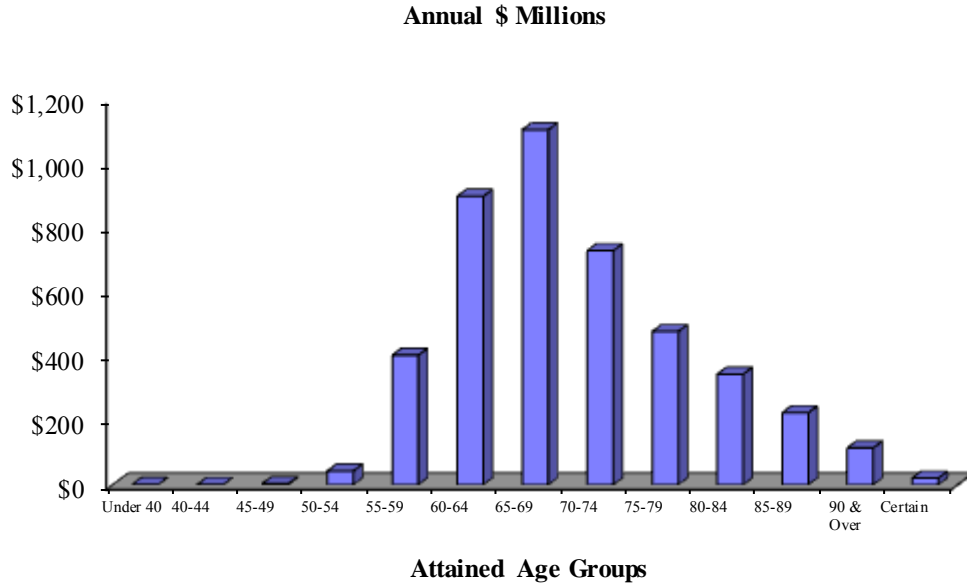
Averages in Years

Age at retirement	59.7	52.0	51.5	59.4
Attained age	70.1	67.4	67.3	70.1

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

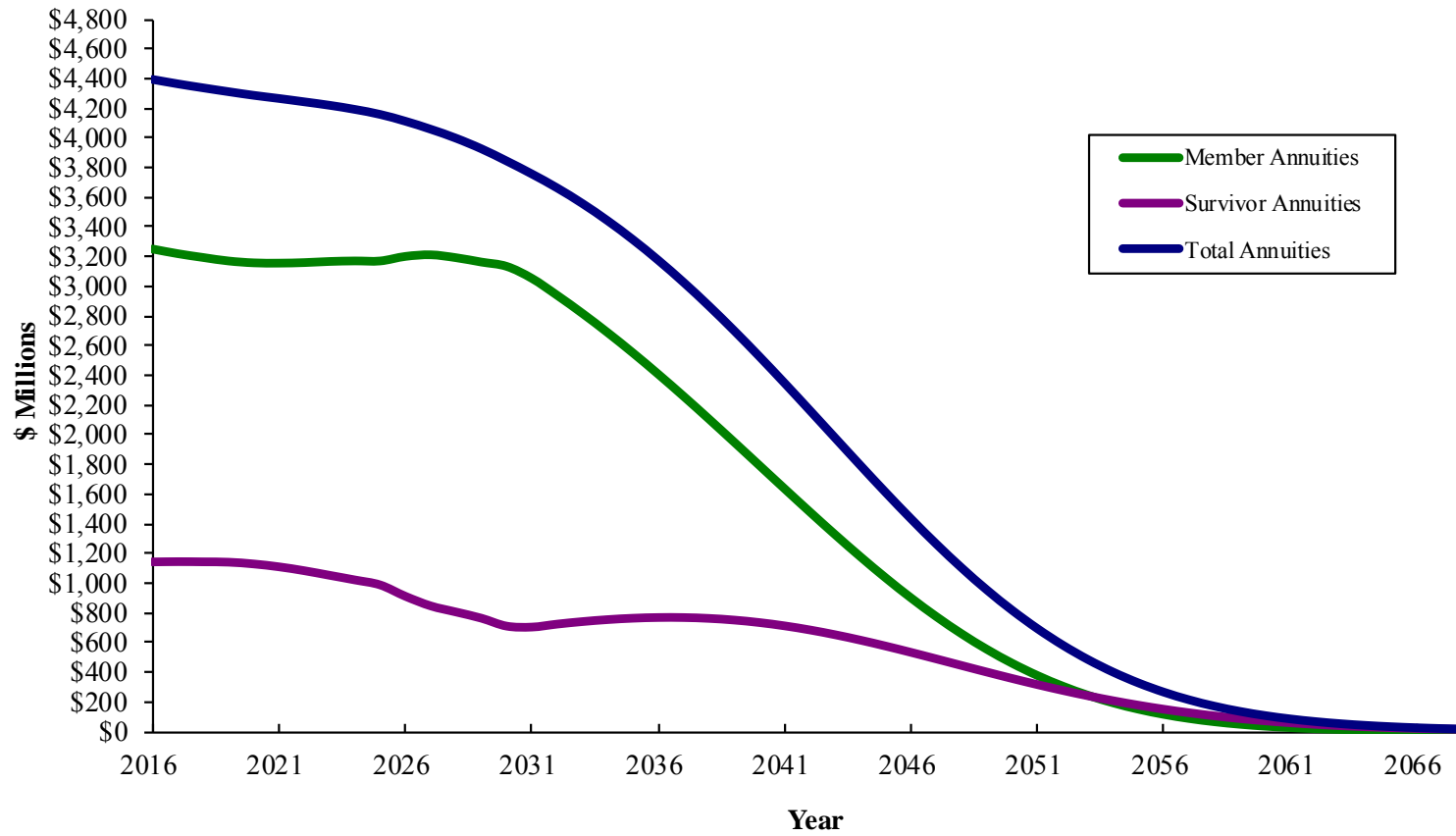
# CORE ANNUITIES BEING PAID BY ATTAINED AGE\*

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\* 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 PRESENT DIVIDENDS**



Total Future Payments	\$114.0 billion
From Present Assets	49.1
From Investment Return	64.9

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**SECTION D**  
**VARIABLE ANNUITIES**

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**VARIABLE ANNUITY DIVISION  
DEVELOPMENT OF ASSETS AND LIABILITIES**

	\$ Millions		Ratio
	Assets	Liabilities	
<b>Ending Balance December 31, 2014</b>	\$3,995.5	\$3,917.1	1.020
Closing Adjustments	2.5	0.0	
Variable Terminations	(90.1)	(90.1)	
2015 Adjustment: 2%	0.0	76.6	
Beginning Balance January 1, 2015	3,907.9	3,903.6	1.001
<b>Increases</b>			
Reserve Transfers	183.3	183.3	
Regular Interest	190.1	190.1	
Additional Earnings	(190.1)	0.0	
Addition for Experience Study/Mortality Reserve	0.0	25.0	
Other	0.0	0.0	
<b>Total Increases</b>	183.3	398.4	
<b>Decreases</b>			
Annuities & Lump Sums	386.4	386.4	
Credit Re-establishments	0.0	0.0	
Subtraction for Experience Study/Mortality Reserve	0.0	0.0	
Other	0.0	5.5	
Total Decreases	386.4	391.9	
<b>Ending Balance December 31, 2015</b>	<b>\$3,704.8</b>	<b>\$3,910.1</b>	<b>0.947</b>



## **RESERVE TRANSFER RECOMMENDATION**

---

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 \$174,570,674. Adjustments to prior transfers, relating to estimated annuities for which final computations have now been made, totaled \$8,728,224. Reserve transfers were distributed as follows:

<b>Group</b>	<b>Regular Transfer</b>	<b>Adjustment to Prior Transfer</b>	<b>Total Transfer</b>
General	\$154,890,380	\$7,785,911	\$162,676,291
Protective with Social Security	13,381,113	926,454	14,307,567
Protective without Social Security	2,807,126	174,046	2,981,172
Executive & Elected	3,492,055	(158,187)	3,333,868
<b>Totals</b>	<b>\$174,570,674</b>	<b>\$8,728,224</b>	<b>\$183,298,898</b>

Accordingly, we recommend that \$183,298,898 be transferred to the Variable Annuity Reserve. The results in this report assume that this transfer has been made.

## DISCUSSION OF VARIABLE ANNUITY CHANGE

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Variable Annuity Reserves, \$3,704.8 million, were less than the actuarial present value of variable annuities, \$3,910.1 million, by \$205.3 million as of December 31, 2015 or 5% of the Actuarial Present Value (APV) of variable annuity payments. In accordance with Section 40.28(2) of the Wisconsin statutes (see page 30), variable annuities will be decreased by 5% effective April 1, 2016. The primary sources of the 5% are as follows:

	<u>% of APV</u>
1. SWIB published investment return	(1.2)%
2. Adjustment to published effective rate	<u>1.2%</u>
3. Published effective earnings rate	0.0%
4. Adjustment to relate earnings to average variable annuity fund balance	<u>0.0%</u>
5. Earnings rate based on average balance	0.0%
6. Expected change before adjustments: 1/1.05-1	(4.8)%
7. Adjustment to relate average asset to ending liability	(0.1)%
8. Carryover from last year due to timing of distribution, accounting adjustments and truncation	0.1%
9. Experience study/mortality reserve adjustment	(0.6)%
11. Experience and other effects	0.1%
12. Statutory adjustment: (truncate to whole percent)	<u>0.3%</u>
<b>13. Variable annuity change: (6)+(7)+(8)+(9)+(10)+(11)+(12)</b>	<b>(5.0)%</b>

**Please see pages 31 and 32 for a description of the items on this page.**

**TRANSFERS TO ANNUITY RESERVE  
TO FINANCE VARIABLE ANNUITIES APPROVED IN 2015  
TABULATED BY TYPE OF ANNUITY AND OPTION**

Alpha Code	Type of Benefit	Number	Annual Amount	Present Value
<b>REGULAR RETIREMENT</b>				
SL	Straight Life	305	\$ 1,783,274	\$ 23,140,774
SL	Straight Life (accelerated)	0	225,626	785,443
A60	Life Annuity with 60 payments guaranteed	161	943,510	12,712,054
A60	Life Annuity with 60 payments guaranteed (accelerated)	0	138,849	449,067
A180	Life Annuity with 180 payments guaranteed	400	2,026,786	28,946,299
A180	Life Annuity with 180 payments guaranteed (accelerated)	0	462,737	1,761,726
JOINT	Joint and 75% Survivor	218	1,255,848	18,937,629
JOINT	Joint and 75% Survivor (accelerated)	0	249,909	888,312
R25	Reduced 25% on First Death	94	596,057	8,383,294
R25	Reduced 25% on First Death (accelerated)	0	89,810	335,094
C100	100% Continued to Named Survivor	205	1,165,682	17,832,596
C100	100% Continued to Named Survivor (accelerated)	0	148,568	575,896
C180	100% Continued to Named Survivor with 180 payments guaranteed	657	3,313,663	51,591,393
C180	100% Continued to Named Survivor with 180 payments guaranteed (accelerated)	0	859,620	3,353,435
AC24	Annuity Certain with 24 Payments	1	3,664	7,101
AC60	Annuity Certain with 60 Payments	0	32,246	142,602
AC120	Annuity Certain with 120 Payments	1	4,431	34,403
AC180	Annuity Certain between 24 and 180 Payments	0	14,603	84,657
	Total Regular	2,042	\$ 13,314,883	\$ 169,961,775
	Average Age at Retirement	60.2 Years		
<b>DISABILITY RETIREMENT</b>				
SL	Straight Life	6	\$ 25,257	\$ 340,523
A60	Life Annuity with 60 payments guaranteed	2	6,397	84,410
A180	Life Annuity with 180 payments guaranteed	8	36,347	510,238
JOINT	Joint and 75% Survivor	1	4,185	64,056
C100	100% Continued to Named Survivor	3	18,555	315,011
C180	100% Continued to Named Survivor with 180 payments guaranteed	20	92,897	1,507,154
	Total Disability	40	\$ 183,638	\$ 2,821,392
	Average Age at Retirement	54.3 Years		
<b>DEATH-IN-SERVICE BENEFITS</b>				
SL	Straight Life	8	\$ 35,488	\$ 534,306
SL	Straight Life (accelerated)	0	7,536	15,642
A180	Life Annuity with 180 payments guaranteed	5	94,035	1,213,440
A180	Life Annuity with 180 payments guaranteed (accelerated)	0	7,068	24,119
	Total Death-in-Service	13	\$ 144,127	\$ 1,787,507
	Average Age at Retirement	57.3 Years		
<b>GRAND TOTAL</b>		<b>2,095</b>	<b>\$ 13,642,648</b>	<b>\$ 174,570,674</b>

*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 TABULATED BY TYPE OF ANNUITY AND OPTION

Alpha Code	Type of Benefit	Number	Annual Amount	Present Value
<b>REGULAR RETIREMENT</b>				
SL	Straight Life	4,811	\$ 42,026,309	\$ 393,265,190
SL	Straight Life (accelerated)	0	819,387	1,915,892
A60	Life Annuity with 60 payments guaranteed	3,766	33,068,047	299,899,193
A60	Life Annuity with 60 payments guaranteed (accelerated)	0	532,378	1,155,570
A120	Life Annuity with 120 payments guaranteed	19	101,278	318,519
A180	Life Annuity with 180 payments guaranteed	7,538	62,399,525	607,614,657
A180	Life Annuity with 180 payments guaranteed (accelerated)	0	1,749,311	4,392,523
A180F	Life Annuity with 180 payments guaranteed (forced)	33	263,358	2,034,545
JOINT	Joint and 75% Survivor	4,925	53,417,953	568,405,879
JOINT	Joint and 75% Survivor (accelerated)	0	911,908	2,019,652
R25	Reduced 25% on First Death	3,636	52,490,894	462,821,380
R25	Reduced 25% on First Death (accelerated)	0	366,470	852,612
C100	100% Continued to Named Survivor	3,631	35,048,154	372,089,552
C100	100% Continued to Named Survivor (accelerated)	0	734,267	1,672,886
C180	100% Continued to Named Survivor with 180 payments guaranteed	9,928	89,279,123	1,076,857,689
C180	100% Continued to Named Survivor with 180 payments guaranteed (accelerated)	0	2,820,980	7,069,356
LOL	Life with Optional Length Guaranteed	6	88,340	337,717
AC24	Annuity Certain with 24 Payments	2	3,664	5,950
AC60	Annuity Certain with 60 Payments	3	84,436	253,217
AC120	Annuity Certain with 120 Payments	2	78,787	394,619
AC180	Annuity Certain between 24 and 180 Payments	2	534,029	2,892,242
C50	50% Continued to One Beneficiary	22	220,254	754,973
C50W180	50% Continued to One Beneficiary with 180 Months guaranteed	5	39,081	118,307
C75WSS	75% Continued to One Beneficiary and Social Security Integrated	22	163,576	861,276
R25W120	Reduced 25% on Death of Annuitant or Named Survivor with 120 Months guaranteed	2	12,857	37,256
A60WSS	Life with 60 Months Guaranteed and Social Security Integrated	25	79,406	264,883
A180WSS	Life with 180 Months Guaranteed and Social Security Integrated	13	87,811	306,327
SLNSD	Straight Life - Named Survivor Deceased	122	1,494,705	13,224,220
Total Regular		38,513	\$378,916,288	\$3,821,836,082

(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  
TABULATED BY TYPE OF ANNUITY AND OPTION**

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<b>Numeric Code</b>	<b>Alpha Code</b>	<b>Type of Benefit</b>	<b>Number</b>	<b>Annual Amount</b>	<b>Present Value</b>
<b>DISABILITY RETIREMENT</b>					
1	SL	Straight Life	135	\$ 610,207	\$ 5,171,085
3	A60	Life Annuity with 60 payments guaranteed	75	490,709	4,148,402
7	A180	Life Annuity with 180 payments guaranteed	247	1,135,869	10,759,197
10	JOINT	Joint and 75% Survivor	108	810,055	8,090,534
12	R25	Reduced 25% on First Death	50	328,696	3,013,793
14	C100	100% Continued to Named Survivor	237	1,312,542	12,551,137
16	C180	100% Continued to Named Survivor with 180 payments guaranteed	428	2,163,504	25,080,381
30	DWSMC	Disability with Spouse or Minor/Dependent Child	3	9,428	44,959
35	SLNSD	Straight Life - Named Survivor Deceased	1	13,447	79,289
Total Disability			1,284	\$ 6,874,457	\$ 68,938,777
<b>DEATH-IN-SERVICE BENEFITS</b>					
1	SL	Straight Life	69	\$ 469,659	\$ 4,631,578
2	SL	Straight Life (accelerated)	0	8,247	14,879
3	A60	Life Annuity with 60 payments guaranteed	34	259,934	2,079,461
4	A60	Life Annuity with 60 payments guaranteed (accelerated)	0	9,780	18,957
7	A180	Life Annuity with 180 payments guaranteed	239	1,245,251	12,351,980
8	A180	Life Annuity with 180 payments guaranteed (accelerated)	0	46,297	195,405
23	AC180	Annuity Certain between 24 and 180 Payments	1	774	186
28	A60WSS	Life with 60 Months Guaranteed and Social Security Integrated	12	9,156	39,860
Total Death-in-Service			355	\$ 2,049,098	\$ 19,332,306
<b>GRAND TOTAL</b>			<b>40,152</b>	<b>\$ 387,839,843</b>	<b>\$ 3,910,107,165</b>

*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  
TABULATED BY ATTAINED AGES**

Attained Ages	Regular		Disability		Death-in-Service		Totals	
	No.	Annual Amount	No.	Annual Amount	No.	Annual Amount	No.	Annual Amount
20-24	0	\$ 0	1	\$ 3,002	3	\$ 2,784	4	\$ 5,786
25-29	0	0	5	2,683	6	3,390	11	6,073
30-34	0	0	7	3,323	3	1,703	10	5,026
35-39	2	790	8	8,362	5	7,240	15	16,392
40-44	2	1,835	5	22,000	12	27,062	19	50,897
45-49	13	43,687	30	62,183	10	33,891	53	139,761
50-54	325	1,224,957	92	222,126	21	72,625	438	1,519,708
55-59	2,924	14,517,776	184	505,379	33	97,823	3,141	15,120,978
60-64	7,018	38,237,899	256	889,816	53	238,407	7,327	39,366,122
65-69	9,764	78,879,649	212	1,210,790	53	238,152	10,029	80,328,591
70-74	6,603	77,612,667	175	1,581,733	39	426,825	6,817	79,621,225
75-79	4,180	61,748,652	129	1,182,478	27	232,184	4,336	63,163,314
80-84	3,325	49,570,459	102	692,522	23	218,552	3,450	50,481,533
85-89	2,542	35,905,581	54	340,466	32	177,801	2,628	36,423,848
90-94	1,207	15,575,103	20	123,903	18	144,788	1,245	15,843,794
95& Up	379	3,845,214	4	23,656	8	44,938	391	3,913,808
Certain Only*	229	1,752,019	0	35	9	80,933	238	1,832,987
<b>Totals</b>	<b>38,513</b>	<b>\$378,916,288</b>	<b>1,284</b>	<b>\$6,874,457</b>	<b>355</b>	<b>\$2,049,098</b>	<b>40,152</b>	<b>\$387,839,843</b>

Averages in Years

Age at retirement	59.1	52.4	51.2	58.9
Attained age	69.9	66.0	68.0	69.8

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

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**SECTION E**  
**COMPARATIVE STATEMENTS**

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**CORE ANNUITIES  
COMPARATIVE STATEMENT  
1983 THROUGH 2015**

Valuation Date	Number	\$ Millions			Ratio	Change in		
		Annual Annuities	Fund Balance	Actuarial Reserve		Annuitants Average	Maximum	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)%	(2.1)%	0.1 %
2009	150,671	3,449.3	36,655.8	37,072.7	0.989	(1.1)%	(1.3)%	2.7 %
2010	155,775	3,532.4	37,798.4	38,148.5	0.991	(0.9)%	(1.2)%	1.5 %
2011	167,453	3,842.0	40,411.5	42,078.3	0.960	(4.0)%	(7.0)%	3.0 %
2012	173,655	3,806.3	40,591.6	41,852.4	0.970	(3.0)%	(9.6)%	1.7 %
2013	180,056	3,800.7	44,273.2	42,300.5	1.047	4.7 %	4.7 %	1.5 %
2014	185,605	4,102.3	47,135.7	45,790.7	1.029	2.9 %	2.9 %	0.8 %
2015	191,795	4,364.9	49,147.0	48,897.5	1.005	0.5 %	0.5 %	0.7 %
<b>33-Year Average</b>						<b>3.4 %</b>		<b>2.7 %</b>
<b>10-Year Average</b>						<b>0.6 %</b>		<b>1.9 %</b>

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

\*\* Including 10.6% Act 11 transfer.

In cases where there is a negative dividend, a maximum decrease is calculated to account for annuitants that are already at the floor and whose dividend cannot be reduced.

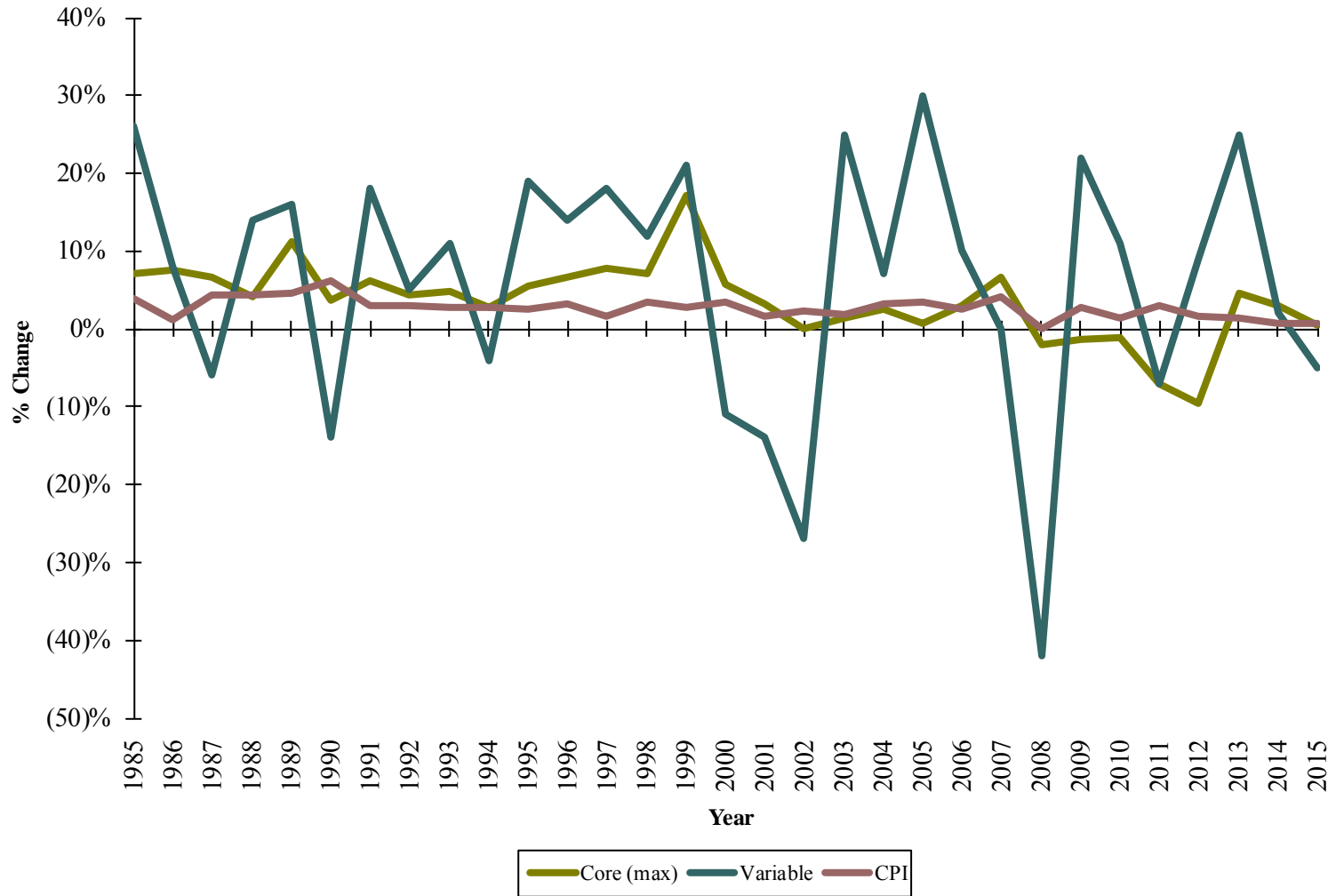


**VARIABLE ANNUITIES  
COMPARATIVE STATEMENT  
1983 THROUGH 2015**

Valuation		\$ Millions				Change in	
		Annual	Fund	Actuarial	Ratio		
Date	Number	Annuitants	Balance	Reserve	Ratio	Annuitants	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 %
2009	34,836	240.3	3,078.4	2,512.7	1.225	22.0 %	2.7 %
2010	35,866	288.4	3,340.6	3,005.4	1.111	11.0 %	1.5 %
2011	38,949	330.3	3,197.9	3,462.9	0.924	(7.0)%	3.0 %
2012	39,873	304.6	3,463.9	3,169.6	1.093	9.0 %	1.7 %
2013	40,317	324.5	4,187.3	3,347.0	1.251	25.0 %	1.5 %
2014	39,420	386.5	3,995.4	3,917.1	1.020	2.0 %	0.8 %
2015	40,152	387.8	3,704.8	3,910.1	0.947	(5.0)%	0.7 %
<b>33-Year Average</b>						<b>4.3 %</b>	<b>2.7 %</b>
<b>10-Year Average</b>						<b>0.6 %</b>	<b>1.9 %</b>

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

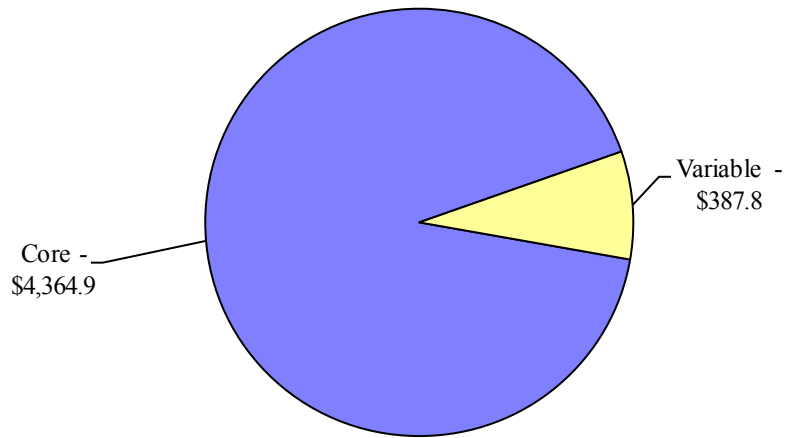
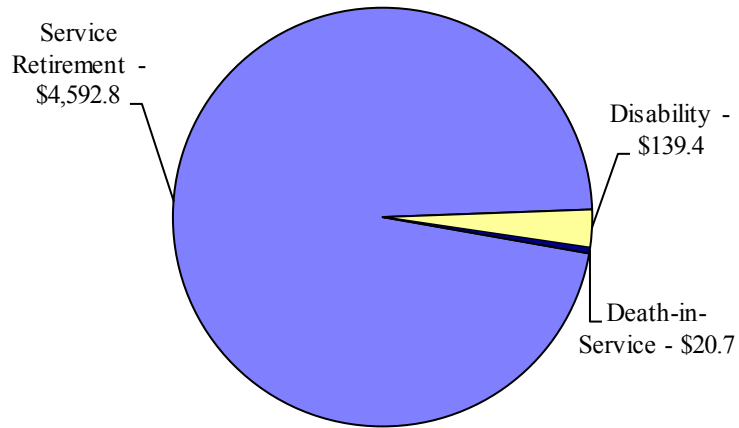
## HISTORY OF % CHANGES IN ANNUITIES AND CPI



# ANNUAL ANNUITIES BEING PAID BY TYPE

## \$ MILLIONS

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**ANNUITIES BEING PAID  
TABULATED BY YEAR OF RETIREMENT  
(\$1,000S ANNUALLY)**

Year Ret'd	Core Annuities				Variable Annuities				Avg. Total Annuity
	No.	Initial	Increases	Total	No.	Initial	Increases	Total	
2015	9,689	\$ 251,308	\$ 0	\$ 251,308	2,034	\$ 12,770	\$ 0	\$ 12,770	\$30,951
2014	9,199	223,533	3,514	227,047	1,762	10,445	210	10,655	29,109
2013	9,528	223,836	12,174	236,010	1,734	8,203	2,256	10,459	28,962
2012	9,514	223,593	17,199	240,792	1,773	7,059	2,750	9,809	29,559
2011	15,261	412,706	31,599	444,305	3,213	16,217	4,742	20,959	35,040
2010	8,359	200,612	15,408	216,020	1,679	6,539	2,842	9,381	30,567
2009	7,884	187,468	14,434	201,902	1,472	4,526	3,396	7,922	30,251
2008	8,542	199,296	15,291	214,587	1,794	11,374	180	11,554	27,252
2007	8,393	181,800	13,990	195,790	1,924	12,826	200	13,026	24,990
2006	8,131	166,363	12,800	179,163	1,777	12,307	1,436	13,743	23,780
2005	8,106	162,219	12,511	174,730	1,803	13,179	1,981	15,160	23,507
2004	7,283	137,418	10,598	148,016	1,669	12,202	2,815	15,017	22,444
2003	7,334	138,735	10,697	149,432	1,546	10,178	5,479	15,657	22,569
2002	6,925	126,066	9,712	135,778	1,359	13,566	1,677	15,243	21,871
2001	6,962	126,358	9,720	136,078	1,453	21,633	(734)	20,899	22,678
2000	6,835	121,778	9,484	131,262	1,233	24,570	(3,450)	21,120	22,380
1999	5,707	88,298	19,692	107,990	1,040	16,717	668	17,385	21,996
1998	5,587	81,368	24,732	106,100	1,067	15,124	2,493	17,617	22,211
1997	4,661	66,069	26,346	92,415	898	10,690	3,999	14,689	23,093
1996	4,567	62,973	31,280	94,253	916	9,571	5,407	14,978	24,038
1995	4,076	54,571	31,685	86,256	813	6,951	6,010	12,961	24,510
1994	3,670	46,321	29,682	76,003	834	6,899	5,454	12,353	24,260
1993	3,305	39,792	27,998	67,790	735	5,175	5,099	10,274	23,706
1992	2,779	31,418	24,661	56,079	625	4,136	4,492	8,628	23,410
1991	2,447	26,627	23,468	50,095	573	3,186	4,663	7,849	23,993
1990	3,905	44,628	42,814	87,442	958	5,854	6,542	12,396	25,871
1989	2,830	31,786	35,260	67,046	645	3,485	5,072	8,557	26,934
1988	2,033	17,969	22,758	40,727	502	2,103	3,785	5,888	23,112
1987	1,659	13,507	19,052	32,559	444	1,737	2,838	4,575	22,810
1986	1,464	11,552	18,753	30,305	411	1,481	2,729	4,210	23,836
1985	1,304	10,357	18,891	29,248	331	891	2,295	3,186	25,260
1984	916	6,565	13,178	19,743	289	807	2,084	2,891	24,983
1983	738	4,149	8,758	12,907	226	532	1,706	2,238	20,745
1982	529	2,256	5,465	7,721	154	270	1,047	1,317	17,148
1981	436	1,560	4,010	5,570	114	140	535	675	14,422
1980	295	961	2,582	3,543	87	100	489	589	14,008
1979	194	583	1,718	2,301	65	65	352	417	14,084
1978	166	445	1,332	1,777	39	25	147	172	11,739
1977	141	366	1,098	1,464	48	32	185	217	12,011
1976	113	297	954	1,251	36	22	127	149	12,499
Prior	328	503	1,603	2,106	77	34	221	255	4,079
<b>Total</b>	<b>191,795</b>	<b>\$3,728,010</b>	<b>\$636,901</b>	<b>\$4,364,911</b>	<b>40,152</b>	<b>\$293,621</b>	<b>\$94,219</b>	<b>\$387,840</b>	<b>\$24,780</b>

**LIABILITIES AS OF DECEMBER 31, 2015**  
**TABULATED BY YEAR OF RETIREMENT**  
**(\$1,000S ANNUALLY)**

Year Ret'd	Core Liabilities				Variable Liabilities				Total Liabilities
	No.	Initial	Increases	Total	No.	Initial	Increases	Total	
2015	9,689	\$ 3,266,111	\$ 0	\$ 3,266,111	2,034	\$ 164,240	\$ 0	\$ 164,240	\$3,430,351
2014	9,199	2,864,909	44,979	2,909,888	1,762	132,443	2,665	135,108	3,044,997
2013	9,528	2,832,419	153,989	2,986,408	1,734	104,006	28,603	132,609	3,119,017
2012	9,514	2,808,516	215,963	3,024,479	1,773	87,854	34,229	122,083	3,146,562
2011	15,261	5,235,107	400,744	5,635,851	3,213	203,763	59,586	263,348	5,899,199
2010	8,359	2,536,587	194,765	2,731,352	1,679	81,891	35,583	117,474	2,848,826
2009	7,884	2,377,167	183,078	2,560,245	1,472	55,257	41,466	96,723	2,656,968
2008	8,542	2,547,534	195,574	2,743,109	1,794	142,368	2,219	144,587	2,887,696
2007	8,393	2,308,945	177,635	2,486,580	1,924	159,832	2,483	162,315	2,648,895
2006	8,131	2,071,747	159,407	2,231,154	1,777	150,603	17,571	168,174	2,399,328
2005	8,106	1,973,727	152,185	2,125,912	1,803	157,364	23,654	181,019	2,306,931
2004	7,283	1,626,361	125,412	1,751,773	1,669	144,471	33,331	177,802	1,929,575
2003	7,334	1,602,146	123,486	1,725,633	1,546	117,315	63,156	180,471	1,906,103
2002	6,925	1,413,953	108,900	1,522,853	1,359	154,588	19,109	173,697	1,696,550
2001	6,962	1,367,803	105,206	1,473,009	1,453	231,728	(7,907)	223,821	1,696,830
2000	6,835	1,292,756	100,596	1,393,352	1,233	259,164	(36,389)	222,775	1,616,127
1999	5,707	899,054	199,630	1,098,684	1,040	166,919	6,672	173,591	1,272,275
1998	5,587	793,768	240,730	1,034,499	1,067	144,037	23,744	167,781	1,202,280
1997	4,661	614,340	244,321	858,660	898	97,384	36,430	133,814	992,474
1996	4,567	560,766	277,618	838,384	916	82,152	46,395	128,547	966,931
1995	4,076	460,879	266,954	727,833	813	56,368	48,743	105,110	832,943
1994	3,670	371,033	237,429	608,461	834	53,554	42,334	95,888	704,349
1993	3,305	303,538	213,275	516,813	735	37,873	37,293	75,166	591,979
1992	2,779	225,199	177,072	402,270	625	28,285	30,723	59,008	461,279
1991	2,447	180,360	158,930	339,290	573	20,417	29,865	50,282	389,572
1990	3,905	298,599	286,385	584,984	958	38,248	42,750	80,998	665,982
1989	2,830	194,883	215,879	410,762	645	20,566	29,930	50,496	461,259
1988	2,033	100,000	126,913	226,914	502	11,324	20,375	31,700	258,613
1987	1,659	70,048	98,209	168,256	444	8,515	13,912	22,427	190,684
1986	1,464	55,563	90,672	146,235	411	7,128	13,128	20,256	166,491
1985	1,304	48,093	87,856	135,948	331	4,118	10,605	14,723	150,671
1984	916	27,833	56,169	84,003	289	3,384	8,737	12,121	96,123
1983	738	16,281	34,218	50,499	226	2,003	6,401	8,404	58,903
1982	529	8,964	21,609	30,572	154	973	3,779	4,752	35,325
1981	436	6,138	15,992	22,130	114	547	2,077	2,624	24,754
1980	295	3,632	9,782	13,414	87	332	1,639	1,971	15,384
1979	194	1,990	5,875	7,865	65	206	1,125	1,331	9,196
1978	166	1,505	4,526	6,031	39	93	552	645	6,676
1977	141	1,205	3,663	4,867	48	113	648	761	5,629
1976	113	1,116	3,609	4,726	36	76	440	517	5,242
Prior	328	1,823	5,821	7,644	77	129	818	947	8,590
<b>Total</b>	<b>191,795</b>	<b>\$43,372,397</b>	<b>\$5,525,058</b>	<b>\$48,897,455</b>	<b>40,152</b>	<b>\$3,131,632</b>	<b>\$778,476</b>	<b>\$3,910,107</b>	<b>\$52,807,563</b>

**COMPARISON OF ACTUAL TO EXPECTED DEATHS AMONG RETIRED LIVES  
(NORMAL RETIREMENT ONLY)  
DURING 2015**

Age	Male Deaths			Female Deaths			Total Deaths		
	Actual	Expected	Exposure	Actual	Expected	Exposure	Actual	Expected	Exposure
30-34									
35-39						2			2
40-44			1			10			11
45-49			19			64			83
50-54	1	2	776	2		502	3	2	1,278
55-59	28	28	5,698	25	22	7,508	53	50	13,206
60-64	90	87	12,971	87	83	19,775	177	170	32,746
65-69	165	202	18,744	144	173	26,518	309	375	45,262
70-74	218	254	14,425	194	211	18,283	412	465	32,708
75-79	319	307	9,935	285	272	12,861	604	579	22,796
80-84	422	408	7,046	395	382	9,436	817	790	16,482
85-89	453	437	4,211	572	542	6,798	1,025	979	11,009
90-94	300	285	1,651	501	467	3,405	801	752	5,056
95-99	104	98	336	259	268	1,137	363	366	1,473
100 & Up	11	10	28	61	51	168	72	61	196
<b>Totals</b>	<b>2,111</b>	<b>2,118</b>	<b>75,841</b>	<b>2,525</b>	<b>2,471</b>	<b>106,467</b>	<b>4,636</b>	<b>4,589</b>	<b>182,308</b>
Average Ages	81.2	80.6	70.7	84.0	83.7	71.1	82.7	82.2	71.0

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**SECTION F**  
**APPENDIX**

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**ACTUARIAL ASSUMPTIONS USED IN THE  
RETIRED LIFE ACTUARIAL VALUATION**

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The interest rate used in the valuation was 5.0% a year, compounded yearly, as provided in Section 40.02 of the Wisconsin Statutes. Please note that we have assumed all current dividends to be payable in the future. To the extent that unfavorable investment performance reduces current dividends, liabilities would be lower than reported in this valuation. The mortality table used in the valuation was the Wisconsin 2015 Mortality Table, as adopted by the Board in connection with the 2012-2014 Experience Study. This table includes margin for future improvements in mortality by incorporating half of the MP-2015 fully generational scale. The impact of the new mortality tables is recognized equally over a three year period.

**SINGLE LIFE RETIREMENT VALUES  
Wisconsin Projected Experience Table - 2015 with 5% Interest**

Sample Attained Ages in 2015	Present Value of \$1 Monthly for Life		Future Life Expectancy (years)		Probability of Death Next Year	
	Males	Females	Males	Females	Males	Females
40	\$209.32	\$214.79	42.9	46.2	0.097%	0.060%
45	200.57	207.16	38.1	41.3	0.128%	0.093%
50	189.76	197.81	33.4	36.5	0.173%	0.138%
55	176.92	186.51	28.8	31.8	0.402%	0.244%
60	162.55	173.10	24.4	27.2	0.571%	0.351%
65	145.37	156.97	20.2	22.8	0.871%	0.537%
70	125.98	137.99	16.1	18.4	1.440%	0.911%
75	104.62	116.67	12.4	14.4	2.448%	1.651%
80	82.32	93.82	9.1	10.7	4.502%	3.089%
85	61.53	71.13	6.4	7.6	8.403%	6.180%

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

Sample Attained Ages in 2015	Present Value of \$1 Monthly for Life		Future Life Expectancy (years)		Probability of Death Next Year	
	Males	Females	Males	Females	Males	Females
40	\$195.44	\$204.64	35.7	39.9	0.147%	0.103%
45	183.42	194.70	31.0	35.1	0.247%	0.156%
50	169.71	182.75	26.5	30.5	0.491%	0.273%
55	153.86	168.56	22.2	25.9	0.661%	0.402%
60	135.36	151.66	18.0	21.5	1.159%	0.627%
65	115.03	132.00	14.2	17.2	1.898%	1.088%
70	93.12	110.18	10.6	13.3	3.298%	1.976%
75	71.31	87.18	7.6	9.8	6.279%	3.725%
80	52.31	65.15	5.3	6.8	11.561%	7.591%
85	36.94	47.44	3.6	4.7	18.643%	13.092%



## **STATUTORY PROVISIONS - POST-RETIREMENT ADJUSTMENTS**

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### **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, except as otherwise provided by the department by rule, 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 and such deficit would result in a 0.5 percent or greater decrease in the amount of annuities in force, except as otherwise provided by the department by rule.

(d) Notwithstanding s 40.03 (2) (i), (7) (d), and (8) (d), the department may promulgate rules under this subsection without the approval of the teachers retirement board and the Wisconsin retirement board.”

### **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 7 AND 17**

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**1. SWIB Published Investment Return**

The earnings rate published by State of Wisconsin Investment Board on the Core/Variable Fund.

**2. MRA Adjustment (Core)/Adjustment to Published Effective Rate (Variable)**

Item 3 below minus Item 1 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 Effective 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 Average Core/Variable 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 7 AND 17**

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### **9. Experience Study/Mortality Reserve Adjustment**

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. Although the mortality table now includes a projection for expected future improvements in mortality, each valuation phases into the full table incrementally over the three year experience study cycle. 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 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.

### **11. 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.

### **12. Computed Average 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 11.

### **13. Adjustment for Members Not Eligible for Negative Dividend**

This is an adjustment that is sometimes made for Core Fund recipients to reflect that some members may not have any remaining dividends and hence are not subject to a further negative dividend.

### **14. Final Maximum Computed Dividend Rate**

When there is a negative dividend for the Core fund, this will affect people differently based upon year of retirement. In years when there is a negative dividend, this will be the largest negative dividend that will occur in the Core fund. If greater in absolute value than 0.5% of core annuities, Item 12 plus Item 13, otherwise 0%.