



# WISCONSIN RETIREMENT SYSTEM



22nd Annual Actuarial Valuations  
of Retired Lives  
December 31, 2004

Gabriel, Roeder, Smith & Company



Actuaries and Consultants



# TABLE OF CONTENTS

## DECEMBER 31, 2004

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<u>Page</u>	
1	<i>Introduction</i>
2-3	<i>Section A - Operation of the System</i>
	<i>Section B - Fixed Annuities</i>
4	Development of Assets and Liabilities
5	Recommendation
6	Discussion
7	Transfers to Annuity Reserve
8-9	Fixed Annuities Being Paid - Type and Option
10-11	Fixed Annuities Being Paid - Attained Ages
12	Projection of Future Fixed Annuity Payments
	<i>Section C - Variable Annuities</i>
13	Development of Assets and Liabilities
14	Recommendation
15	Discussion
16	Transfers to Annuity Reserve
17-18	Variable Annuities Being Paid - Type and Option
19	Variable Annuities Being Paid - Attained Ages
	<i>Section D - Comparative Statements</i>
20-22	Annuities by Valuation Year
23	Annuities by Type
24	Annuities by Year of Retirement
25	Actual vs. Expected Deaths
	<i>Section E - Appendix</i>
26	Single Life Retirement Values
27	Statutory Provisions
28-29	Narrative Regarding the Development of Dividend and Variable Rate Changes



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March 1, 2005

Employee Trust Funds Board  
 Madison, Wisconsin

Ladies and Gentlemen:

The results of the **22nd annual actuarial valuation of fixed 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, 2004**. Actuarial assumptions used in the valuation are summarized in the Appendix.

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

	<b>Fixed</b>	<b>Variable</b>
Number of Annuitants	126,211	30,270
Annual Amount	\$ 2,500.3	\$ 346.0
Fund Balance	26,920.0	3,909.9
Actuarial Reserve	26,232.2	3,654.5
<b>Ratio</b>	<b>1.026</b>	<b>1.070</b>

Based upon these results, fixed annuities were increased by 2.6% effective April, 2005 and variable annuities were increased by 7%.

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

Respectfully submitted,

GABRIEL, ROEDER, SMITH & COMPANY

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# SECTION A



## Operation of the System

## 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 of 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 (CONCLUDED)

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

***Fixed Annuity Division.*** If the supplemental reserve is positive and is at least 0.5% of fixed annuity liabilities, fixed annuity increases (dividends) may be granted. If the supplemental reserve is negative and is equal to or greater than 0.5% of fixed annuity liabilities in absolute value, prior fixed 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



## Fixed Annuities

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

	\$ Millions		Ratio
	Assets	Liabilities	
<b>Ending Balance December 31, 2003</b>	\$25,071.9	\$24,724.0	1.014
Closing Adjustments	(2.6)	0.0	
Variable Terminations	63.6	63.6	
2004 Dividend: 1.4%	0.0	322.9	
<b>Beginning Balance January 1, 2004</b>	25,132.9	25,110.5	1.001
<b>Increases</b>			
Reserve Transfers	2,241.4	2,241.4	
Regular Interest	1,249.8	1,249.8	
Additional Earnings	775.5	0.0	
Addition to Contingency/Data Reserve	0.0	86.6	
Experience Study	0.0	0.0	
Other	0.0	23.5	
<b>Total Increases</b>	4,266.7	3,601.3	
<b>Decreases</b>			
Annuities & Lump Sums	2,471.0	2,471.0	
Credit Re-establishments	8.6	8.6	
Releases from Contingency/Data Reserve	0.0	0.0	
Experience Study	0.0	0.0	
Other	0.0	0.0	
<b>Total Decreases</b>	2,479.6	2,479.6	
<b>Ending Balance December 31, 2004</b>	<b>\$26,920.0</b>	<b>\$26,232.2</b>	<b>1.026</b>

The ending liability balance includes data and contingency reserves of \$234.3 million.



## RESERVE TRANSFER RECOMMENDATION DECEMBER 31, 2004

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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 fixed annuities reported as new since the last actuarial valuation is \$2,153,347,383. Adjustments to prior transfers, relating to estimated annuities for which final computations have now been made, totaled \$88,062,483. Reserve transfers are distributed as follows:

Group	Regular Transfer	Adjustment to Prior Transfer	Total Transfer
General	\$1,937,570,713	\$76,494,594	\$2,014,065,307
Protective with Social Security	157,523,887	6,245,275	163,769,162
Protective without Social Security	38,226,923	4,516,206	42,743,129
Executive & Elected	20,025,860	806,408	20,832,268
<b>Totals</b>	<b>\$2,153,347,383</b>	<b>\$88,062,483</b>	<b>\$2,241,409,866</b>

Accordingly, we recommend that \$2,241,409,866 be transferred to the Fixed Annuity Reserve. The results in this report assume that this transfer has been made.

## DISCUSSION OF DIVIDEND DECEMBER 31, 2004

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The Fixed Annuity Fund Balance, \$26,920.0 million, exceeded the actuarial present value of fixed annuities and reserves, \$26,232.2 million, by \$687.8 million or 2.6% of the actuarial present value (APV) of fixed annuity payments. The primary sources of the 2.6% are:

	<b>% of APV</b>
1. Published earnings rate	8.50%
2. Adjustment to relate earnings to average fixed annuity balance	(0.40)%
3. Earnings rate based on average balance	8.10%
4. Expected dividend before adjustments: 1.081/1.05-1	2.95%
5. Adjustment to relate average asset to ending liability	0.01%
6. Carryover from last year due to timing of dividend accounting adjustments, and rounding	0.09%
7. Adjustments to contingency reserve and data reserve	(0.33)%
8. Experience Study	0.00%
9. Experience and other effects	(0.10)%
10. Statutory adjustment to round to nearest one-tenth percent	(0.02)%
<b>11. Computed dividend rate: (4) + (5) + (6) + (7) + (8) + (9) + (10)</b>	<b>2.6%</b>

In accordance with the Administrative Code, ETF 20.25 and Section 40.27(2) Wisconsin Statutes (see page 27), the 2.6% was allocated to a dividend effective April, 2005.

**TRANSFERS TO ANNUITY RESERVE  
TO FINANCE FIXED ANNUITIES APPROVED IN 2004  
TABULATED BY TYPE OF ANNUITY AND OPTION**

Code	Type of Benefit	Number	Annual Amount	Transfer
<b>REGULAR RETIREMENT</b>				
1	Straight Life	949	\$ 15,829,755	\$ 214,349,564
2	5-Year Certain & Life	873	15,756,813	215,509,791
4	15-Year Certain & Life	1,620	26,021,299	373,503,029
7	Joint and 75%	889	19,092,885	289,321,890
9	Joint and 75% on First Death	386	9,314,841	133,705,575
11	Joint and 100%	592	9,886,761	152,017,219
12	Joint and 100% & 15-Year Certain	1,818	33,630,494	533,893,523
13	Temporary to Age 62*	0	42,326,621	178,868,426
21	Certain Only*	0	331,127	1,664,037
40	Mandatory & 15-Year Certain	15	77,549	923,086
41	Mandatory & Certain for Life Expectancy	0	0	0
42	Voluntary & Certain for Life Expectancy	0	0	0
Total Regular		7,142	172,268,145	2,093,756,140
Average Age at Retirement		59.1 Years		
<b>DISABILITY RETIREMENT</b>				
1	Straight Life	0	0	0
2	5-Year Certain & Life	1	20,235	291,360
4	15-Year Certain & Life	0	0	0
7	Joint and 75%	0	0	0
9	Joint and 75% on First Death	0	0	0
11	Joint and 100%	0	0	0
12	Joint and 100% & 15-Year Certain	54	1,210,028	19,452,115
17	5-Years Certain & Life or Survivor	20	454,447	5,652,620
21	Certain Only*	0	0	0
24	Straight Life	14	376,250	4,902,323
25	15-Year Certain & Life	26	583,595	7,976,871
26	Joint & 75 %	9	159,380	2,401,956
27	Joint & 100%	18	382,027	6,056,327
28	Joint & 75% on First Death	5	138,004	1,741,086
Total Disability		147	3,323,966	48,474,658
Average Age at Retirement		53.2 Years		
<b>DEATH-IN-SERVICE BENEFITS</b>				
1	Straight Life	10	163,931	2,165,353
2	5-Year Certain & Life	4	47,924	688,860
4	15-Year Certain & Life	41	475,000	7,157,889
13	Temporary to Age 62*	0	163,031	1,060,444
21	Certain Only*	0	0	0
42	Voluntary & Certain for Life Expectancy	1	5,196	44,039
Total Death-in-Service		56	855,082	11,116,585
Average Age at Retirement		52.7 Years		
<b>GRAND TOTAL</b>		<b>7,345</b>	<b>\$176,447,193</b>	<b>\$2,153,347,383</b>

\* Many annuities in this category were additional annuities. The number counts are included elsewhere.

**FIXED ANNUITIES BEING PAID DECEMBER 31, 2004**  
**TABULATED BY TYPE OF ANNUITY AND OPTION**

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Code	Type of Benefit	Number	Amount	Value
<b>REGULAR RETIREMENT</b>				
1	Straight Life	15,912	\$ 256,645,445	\$ 2,567,867,381
2	5-Year Certain & Life	17,961	282,065,510	2,661,064,618
3	10-Year Certain & Life	672	9,787,166	44,001,275
4	15-Year Certain & Life	27,817	449,958,828	4,420,781,398
5	Joint and 50%	202	3,366,774	17,231,626
6	Joint and 50% and 15-Year Certain	34	328,655	1,447,542
7	Joint and 75%	14,506	310,707,412	3,752,454,805
8	Joint and 75% Integrated	136	2,628,292	20,343,807
9	Joint and 75% on First Death	11,642	298,610,085	3,221,960,987
10	Joint and 75% & 10-Year Certain	35	423,524	1,637,726
11	Joint and 100%	9,635	176,261,212	2,130,903,981
12	Joint and 100% & 15-Year Certain	18,621	363,444,761	5,025,013,114
13	Temporary to Age 62*	1	188,233,700	526,702,729
14	5-Year Certain & Life Integrated	460	2,787,493	15,146,589
15	15-Year Certain & Life Integrated	286	5,747,249	32,555,083
20	Cash Refund Annuity	1	3,706	12,715
21	Certain Only*	7	3,781,680	18,129,839
22	Joint and \$600	0	0	0
25	15-Year Certain & Life & Survivor	2	19,281	217,679
40	Mandatory and Certain for 15 Years	80	426,154	4,492,496
41	Mandatory & Certain for Life Expectancy	17	230,811	1,685,654
42	Voluntary & Certain for Life Expectancy	129	1,914,861	14,372,030
99	Joint and 66-2/3% Original Amount	416	3,019,704	18,120,032
99	Joint and 66-2/3% Dividends	0	8,734,918	51,071,298
Total Regular		118,572	\$2,369,127,221	\$24,547,214,404

\* Many annuities in this category were additional annuities. The number counts are included elsewhere.

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**FIXED ANNUITIES BEING PAID DECEMBER 31, 2004**  
**TABULATED BY TYPE OF ANNUITY AND OPTION**  
**(CONCLUDED)**

Code	Type of Benefit	Number	Annual Amount	Present Value
<b>DISABILITY RETIREMENT</b>				
1	Straight Life	9	\$ 79,666	\$ 675,671
2	5-Year Certain & Life *	3	40,379	510,670
3	10-Year Certain & Life *	0	0	0
4	15-Year Certain & Life	2	50,616	663,145
7	Joint and 75% *	2	59,509	783,872
9	Joint and 100%	0	0	0
11	Joint and 100%	2	44,119	598,619
12	Joint and 100% & 15-Year Certain	1,416	25,956,430	366,039,393
17	5-Year Certain & Life or Survivor	780	15,530,070	125,677,168
18	Cash Refund Annuity	172	2,383,288	10,156,080
21	Certain Only	0	17,628	60,737
23	Joint and \$600	7	21,573	43,563
24	Straight Life	601	13,338,040	135,045,696
25	15-Year Certain & Life or Survivor	1,269	25,482,910	261,827,271
26	Straight Life & Joint & 75%	507	9,944,659	115,147,524
27	Straight Life & Joint & 100%	1,277	21,873,174	275,944,557
28	Joint & 75% on First Death	246	4,835,008	42,635,811
99	Joint & 66-2/3% Original Amount	53	199,266	1,147,803
99	Joint & 66-2/3% Dividends	0	671,427	3,856,661
Total Disability		6,346	120,527,762	1,340,814,241
<b>DEATH-IN-SERVICE BENEFITS</b>				
1	Straight Life	285	2,107,933	21,852,101
2	5-Year Certain & Life	129	1,467,238	15,607,716
4	15-Year Certain & Life	677	5,570,100	64,563,834
7	Joint and 75%	1	39,758	250,921
12	Joint and 100% & 15-Year Certain	4	19,918	254,636
13	Temporary to Age 62*	0	929,300	3,892,889
14	5-Year Certain & Life Integrated	166	165,710	912,397
15	15-Year Certain & Life Integrated	2	46,882	310,781
17	5-Year Certain & Life or Survivor	1	3,172	19,347
21	Certain Only*	3	36,528	102,880
22	Joint and \$600	0	0	0
23	Joint and \$600	0	0	0
42	Voluntary & Certain for Life Expec	22	219,147	1,406,695
99	Joint & 66-2/3% Original Amount	3	25,059	201,556
99	Joint & 66-2/3% Dividends	0	62,148	492,598
Total Death-in-Service		1,293	\$ 10,692,893	\$ 109,868,351
<b>GRAND TOTAL</b>		<b>126,211</b>	<b>\$2,500,347,876</b>	<b>\$25,997,896,996</b>

\* Many annuities in this category were additional annuities. The number counts are included elsewhere.

**FIXED ANNUITIES BEING PAID DECEMBER 31, 2004**  
**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	8	\$ 45,885	7	\$ 50,278	15	\$ 96,163
20-24	0	0	8	35,436	7	42,801	15	78,237
25-29	1	5,883	11	78,017	10	56,460	22	140,360
30-34	3	18,677	20	179,705	12	59,457	35	257,839
35-39	7	44,731	49	815,880	12	64,345	68	924,956
40-44	25	266,040	131	2,188,460	23	137,596	179	2,592,096
45-49	77	774,483	318	5,843,712	41	292,104	436	6,910,299
50-54	903	22,015,075	734	15,118,349	58	616,422	1,695	37,749,846
55-59	14,707	386,201,790	1,091	23,307,985	123	1,710,523	15,921	411,220,298
60-64	21,488	476,305,114	1,078	21,825,820	145	1,689,605	22,711	499,820,539
65-69	22,047	418,590,757	962	19,411,516	145	1,369,717	23,154	439,371,990
70-74	19,301	376,933,150	792	14,344,803	141	1,174,909	20,234	392,452,862
75-79	16,251	314,502,565	578	9,575,289	173	1,368,637	17,002	325,446,491
80-84	12,050	215,991,646	372	5,463,384	148	850,711	12,570	222,305,741
85-89	6,896	98,675,561	142	1,844,192	129	568,731	7,167	101,088,484
90-94	2,900	33,444,259	48	401,364	73	347,654	3,021	34,193,277
95& Up	858	7,670,685	4	30,330	22	120,787	884	7,821,802
Certain Only*	1,058	17,686,805	0	17,635	24	172,156	1,082	17,876,596
<b>Totals</b>	<b>118,572</b>	<b>\$2,369,127,221</b>	<b>6,346</b>	<b>\$120,527,762</b>	<b>1,293</b>	<b>\$10,692,893</b>	<b>126,211</b>	<b>\$2,500,347,876</b>

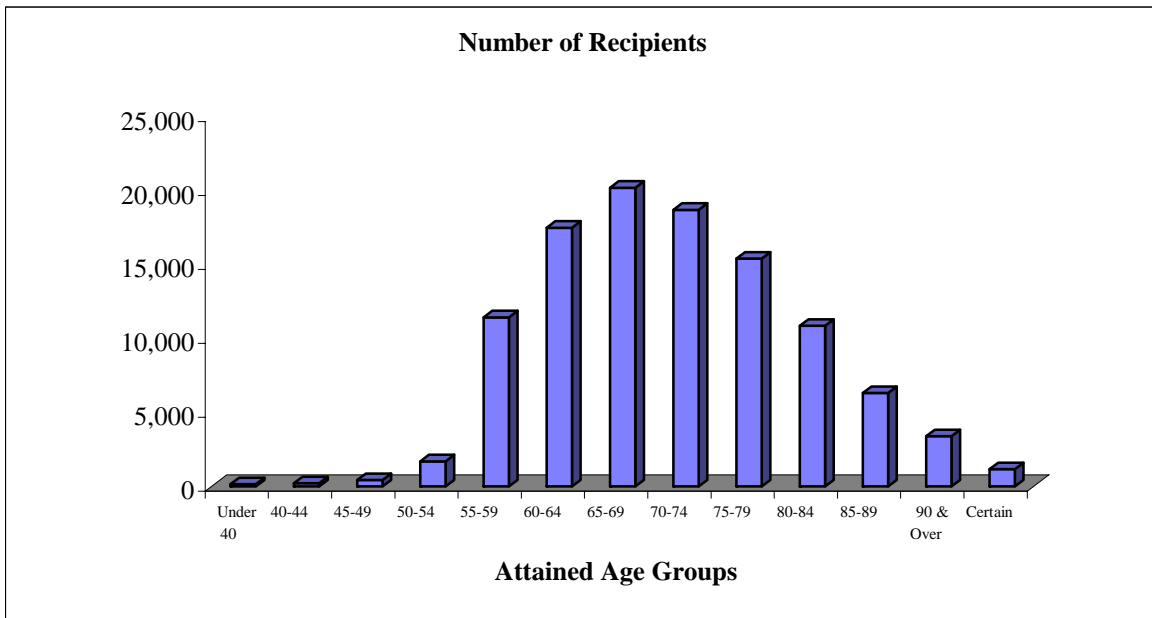
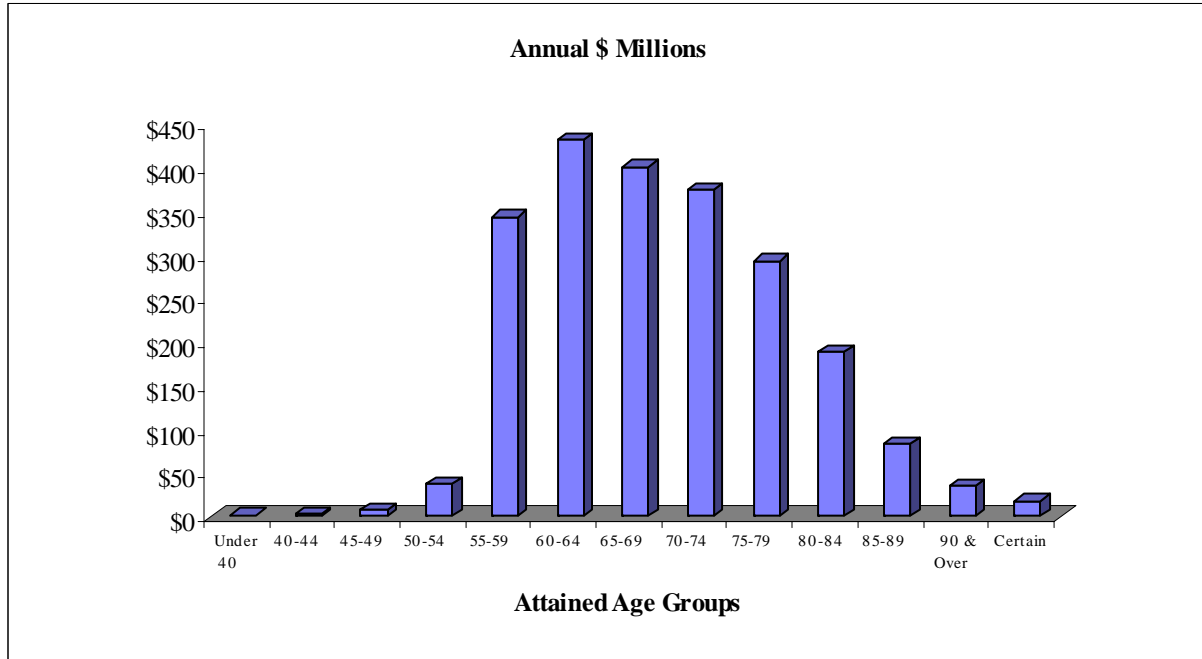
Averages in Years

Age at retirement	60.3	52.2	50.4	59.8
Attained age	70.7	64.3	70.4	70.4
Service at retirement	23.1	17.8	21.1	22.9

\* Certain only category consists of continuations of 5, 10 and 15-year certain and life annuities to beneficiaries of deceased annuitants, and all option 21 annuities.

## FIXED ANNUITIES BEING PAID BY ATTAINED AGE\* DECEMBER 31, 2004

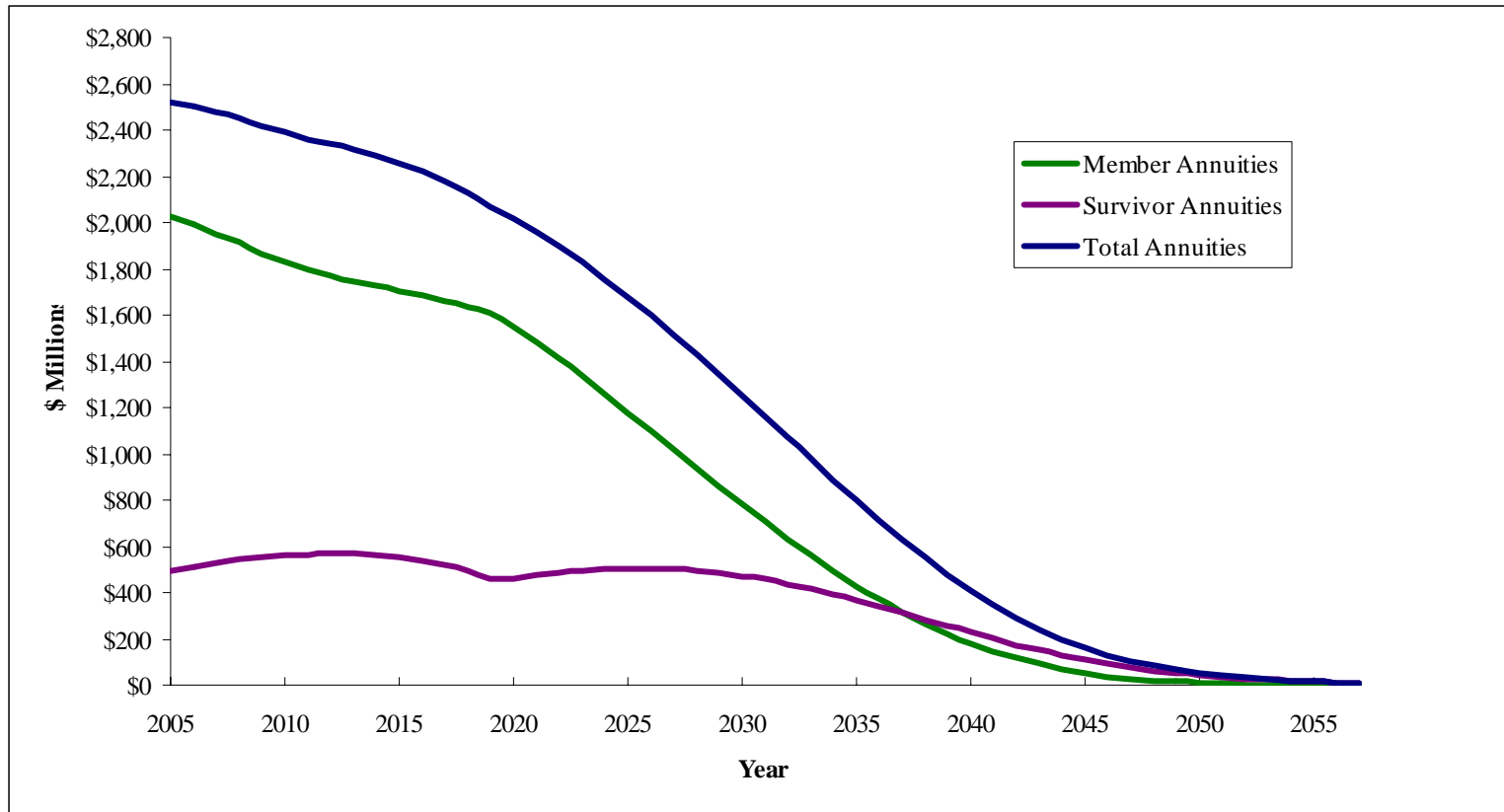
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\* Includes regular and disability retirees and survivor beneficiaries. The "certain" category includes annuities paid for a fixed period which is not dependent upon the age of the recipient.

**PROJECTED FUTURE FIXED ANNUITY PAYMENTS  
ON BEHALF OF PRESENT RETIRED LIVES  
INCLUDING FUTURE DIVIDENDS**

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Total Future Payments	\$	62,719	million
From Present Assets		26,920	
From Investment Return		35,799	



# SECTION C



## Variable Annuities

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

	\$ Millions		Ratio
	Assets	Liabilities	
<b>Ending Balance December 31, 2003</b>	\$3,635.9	\$2,892.2	1.257
Closing Adjustments	(9.6)	0.0	
Variable Terminations	(63.6)	(63.6)	
2004 Adjustment:25%	0.0	705.4	
Beginning Balance January 1, 2004	3,562.7	3,534.0	1.008
<b>Increases</b>			
Reserve Transfers	255.7	255.7	
Regular Interest	174.9	174.9	
Additional Earnings	244.1	0.0	
Addition to Contingency/Data Reserve	0.0	13.9	
Experience Study	0.0	0.0	
Other	0.0	3.5	
<b>Total Increases</b>	674.7	448.0	
<b>Decreases</b>			
Annuities & Lump Sums	326.6	326.6	
Credit Re-establishments	0.9	0.9	
Release from Contingency/Data Reserve	0.0	0.0	
Experience Study	0.0	0.0	
Other	0.0	0.0	
<b>Total Decreases</b>	327.5	327.5	
<b>Ending Balance December 31, 2004</b>	<b>\$3,909.9</b>	<b>\$3,654.5</b>	<b>1.070</b>

The ending liability balance includes contingency reserves of \$25.4 million.

## RESERVE TRANSFER RECOMMENDATION DECEMBER 31, 2004

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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 variable annuities reported as new since the last actuarial valuation is \$249,808,372. Adjustments to prior transfers, relating to estimated annuities for which final computations have now been made, totaled \$5,912,067. Reserve transfers were distributed as follows:

Group	Regular Transfer	Adjustment to Prior Transfer	Total Transfer
General	\$237,995,097	\$5,063,064	\$243,058,161
Protective with Social Security	7,814,248	836,554	8,650,802
Protective Without Social Security	2,166,400	8,082	2,174,482
Executive & Elected	1,832,627	4,367	1,836,994
<b>Totals</b>	<b>\$249,808,372</b>	<b>\$5,912,067</b>	<b>\$255,720,439</b>

Accordingly, we recommend that \$255,720,439 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, 2004

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Variable Annuity Reserves, \$3,909.9 million, exceeded the actuarial present value of variable annuities, \$3,654.5 million, by \$255.4 million as of December 31, 2004 or 7% 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 increased by 7% effective April, 2005. The primary sources of the 7% are as follows:

	<b>% of APV</b>
1. Published earnings rate based on beginning of year balances	12.0%
2. Adjustment to relate earnings to average variable annuity fund balance	(0.1)%
3. Earnings rate based on average balance	11.9%
4. Expected change before adjustments: 1.119/1.05-1	6.6%
5. Adjustment to relate average asset to ending liability	0.1%
6. Carryover from last year due to timing of distribution, accounting adjustments, and truncation	0.8%
7. Adjustments to contingency reserve	(0.4)%
8. Experience Study	0.0%
9. Experience and other effects	(0.1)%
10. Statutory adjustment to truncate to whole percent	0.0%
<b>11. Variable annuity change: (4)+(5)+(6)+(7)+(8)+(9)+(10)</b>	<b>7.0%</b>

**TRANSFERS TO ANNUITY RESERVE  
TO FINANCE VARIABLE ANNUITIES APPROVED IN 2004  
TABULATED BY TYPE OF ANNUITY AND OPTION**

Code	Type of Benefit	Number	Annual Amount	Transfer
<b>REGULAR RETIREMENT</b>				
1	Straight Life	209	\$ 1,620,905	\$ 21,271,024
2	5-Year Certain & Life	215	1,801,761	24,612,005
4	15-Year Certain & Life	398	2,962,147	42,425,275
7	Joint and 75%	253	2,296,445	34,887,223
9	Joint and 75% on First Death	113	1,294,939	18,424,049
11	Joint and 100%	153	1,340,741	20,558,551
12	Joint and 100% & 15-Year Certain	511	4,116,275	65,237,903
13	Temporary to Age 62*	0	4,359,667	18,592,597
21	Certain Only*	0	59,372	368,617
40	Mandatory & Certain for Life Expec	1	3,559	43,919
41	Mandatory & Certain for Life Expec	0	0	0
42	Voluntary & Certain for Life Expec	0	0	0
Total Regular		1,853	19,855,811	246,421,163
Average Age at Retirement		58.5 Years		
<b>DISABILITY RETIREMENT</b>				
11	Joint and 100%	0	0	0
12	Joint and 100% & 15-Year Certain	17	32,918	516,817
17	5-Year Certain & Life or Survivor	5	18,623	237,446
21	Certain Only*	0	0	0
24	Straight Life	4	27,041	288,834
25	15-Year Certain & Life	11	32,714	435,285
26	Joint & 75 %	3	12,494	181,817
27	Joint & 100%	4	27,439	423,350
28	Joint & 75% on First Death	2	1,000	12,916
Total Disability		46	152,229	2,096,465
Average Age at Retirement		52.0 Years		
<b>DEATH-IN-SERVICE BENEFITS</b>				
1	Straight Life	3	20,163	280,089
2	5-Year Certain & Life	1	30,709	443,706
4	15-Year Certain & Life	11	22,839	342,739
13	Temporary to Age 62*	0	33,397	153,756
21	Certain Only*	1	8,986	70,454
42	Voluntary & Certain for Life Expec	0	0	0
Total Death-in-Service		16	116,094	1,290,744
Average Age at Retirement		55.9 Years		
<b>GRAND TOTAL</b>		<b>1,915</b>	<b>\$20,124,134</b>	<b>\$249,808,372</b>

\* Many annuities in this category were additional annuities. The number counts are included elsewhere.

**VARIABLE ANNUITIES BEING PAID DECEMBER 31, 2004**  
**TABULATED BY TYPE OF ANNUITY AND OPTION**

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Code	Type of Benefit	Number	Annual Amount	Present Value
<b>REGULAR RETIREMENT</b>				
1	Straight Life	3,404	\$ 34,302,290	\$ 330,177,593
2	5-Year Certain & Life	3,736	32,768,795	303,386,865
3	10-Year Certain & Life	174	1,273,843	5,576,711
4	15-Year Certain & Life	6,010	55,894,563	558,190,886
5	Joint and 50%	110	858,897	4,347,675
6	Joint and 50% and 15-Year Certain	28	194,122	909,008
7	Joint and 75%	3,863	45,139,873	544,397,028
8	Joint and 75% Integrated	42	244,242	1,922,951
9	Joint and 75% on First Death	3,820	56,069,596	598,119,448
10	Joint and 75% & 10-Year Certain	22	154,511	600,713
11	Joint and 100%	2,443	26,641,487	311,172,655
12	Joint and 100% & 15-Year Certain	4,893	58,775,032	803,740,146
13	Temporary to Age 62*	1	22,414,290	61,625,208
14	5-Year Certain & Life Integrated	130	337,676	1,789,333
15	15-Year Certain & Life Integrated	70	369,360	2,040,100
21	Certain Only*	1	1,181,297	5,317,662
25	15-Year Certain & Life or Survivor	1	1,865	5,979
40	Mandatory & Certain for 15 years	11	107,076	1,132,979
41	Mandatory & Certain for Life Expec	3	17,284	137,637
42	Voluntary & Certain for Life Expec	16	315,562	2,173,731
Total Regular		28,778	\$337,061,661	\$3,536,764,308

\* Many annuities in this category were additional annuities. The number counts are included elsewhere.

(concluded on next page)

**VARIABLE ANNUITIES BEING PAID DECEMBER 31, 2004**  
**TABULATED BY TYPE OF ANNUITY AND OPTION**  
**(CONCLUDED)**

Code	Type of Benefit	Number	Annual Amount	Present Value
<b>DISABILITY RETIREMENT</b>				
1	Straight Life	3	\$ 13,765	\$ 109,837
2	5-Year Certain & Life*	0	0	0
4	15-Year Certain & Life	0	0	0
7	Joint and 75%*	0	57	691
11	Joint and 100%	1	22,159	241,864
12	Joint and 100% & 15-Year Certain	248	1,685,567	22,588,293
17	5-Year Certain & Life or Survivor	152	768,496	5,800,339
18	Cash Refund Annuity	39	106,050	322,241
21	Certain Only*	0	0	0
24	Straight Life	98	573,614	4,902,611
25	15-Year Certain & Life or Survivor	189	1,160,202	11,174,854
26	Straight Life & Joint & 75%	112	828,023	8,916,598
27	Straight Life & Joint & 100%	245	1,420,710	16,988,516
28	Joint & 75% on First Death	63	427,945	3,576,780
Total Disability		1,150	\$ 7,006,588	\$ 74,622,624
<b>DEATH-IN-SERVICE BENEFITS</b>				
1	Straight Life	57	\$ 345,252	\$ 3,098,460
2	5-Year Certain & Life	37	294,423	3,061,153
4	15-Year Certain & Life	206	1,100,631	10,781,238
13	Temporary to Age 62*	0	145,272	466,880
14	5-Year Certain & Life Integrated	39	32,946	186,768
21	Certain Only*	1	8,986	67,513
42	Voluntary & Certain for Life Expec	2	8,384	42,060
Total Death-in-Service		342	\$ 1,935,894	\$ 17,704,072
<b>GRAND TOTAL</b>		<b>30,270</b>	<b>\$346,004,143</b>	<b>\$3,629,091,004</b>

\* Many annuities in this category were additional annuities. The number counts are included elsewhere.

**VARIABLE ANNUITIES BEING PAID DECEMBER 31, 2004**  
**TABULATED BY ATTAINED AGES**

Attained Ages	Regular		Disability		Death-in-Service		Totals	
	No.	Annual Amount	No.	Annual Amount	No.	Annual Amount	No.	Annual Amount
25-29	0	\$ 0	2	\$ 3,550	1	\$ 1,742	3	\$ 5,292
30-34	0	0	5	38,450	6	8,369	11	46,819
35-39	3	14,608	11	16,197	0	0	14	30,805
40-44	4	64,544	25	20,654	7	5,779	36	90,977
45-49	18	81,214	40	81,392	10	23,650	68	186,256
50-54	205	1,996,087	103	348,091	14	81,091	322	2,425,269
55-59	4,077	53,112,376	192	1,304,869	32	229,939	4,301	54,647,184
60-64	5,103	68,248,211	190	1,577,595	35	340,225	5,328	70,166,031
65-69	4,717	59,232,256	176	1,295,861	35	230,124	4,928	60,758,241
70-74	4,553	54,607,254	167	1,073,385	30	181,545	4,750	55,862,184
75-79	4,080	45,527,664	115	646,308	47	196,152	4,242	46,370,124
80-84	3,037	29,552,159	81	401,066	43	207,197	3,161	30,160,422
85-89	1,783	14,812,837	33	177,965	41	210,468	1,857	15,201,270
90-94	758	5,607,776	7	14,154	22	83,226	787	5,705,156
95& Up	211	1,299,526	0	0	6	61,990	217	1,361,516
Certain Only*	229	2,905,149	3	7,051	13	74,397	245	2,986,597
<b>Totals</b>	<b>28,778</b>	<b>\$337,061,661</b>	<b>1,150</b>	<b>\$7,006,588</b>	<b>342</b>	<b>\$1,935,894</b>	<b>30,270</b>	<b>\$346,004,143</b>

Averages in Years

Age at retirement	59.9	52.7	51.9	59.6
Attained age	70.6	65.7	71.7	70.5
Service at retirement	25.4	20.6	23.2	25.2

\* Certain only category consists of continuations of 5, 10 and 15-year certain and life annuities to beneficiaries of deceased annuitants, and all option 21 annuities.



## SECTION D



# Comparative Statements

**FIXED ANNUITIES  
COMPARATIVE STATEMENT  
1983 THROUGH 2004**

Year	Number	\$ Millions			Ratio	Change in	
		Annual Annuities	Fund Balance	Actuarial Reserve		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 %
<b>22-Year Average</b>						<b>5.7 %</b>	<b>3.1 %</b>
<b>10-Year Average</b>						<b>5.6 %</b>	<b>2.4 %</b>

\* Including 10.6% Act 11 transfer.

**VARIABLE ANNUITIES  
COMPARATIVE STATEMENT  
1983 THROUGH 2004**

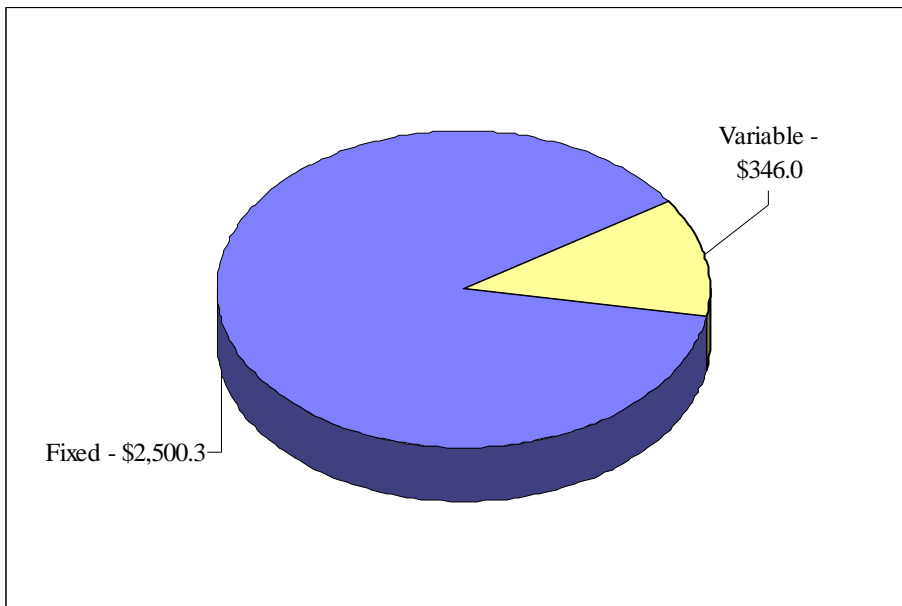
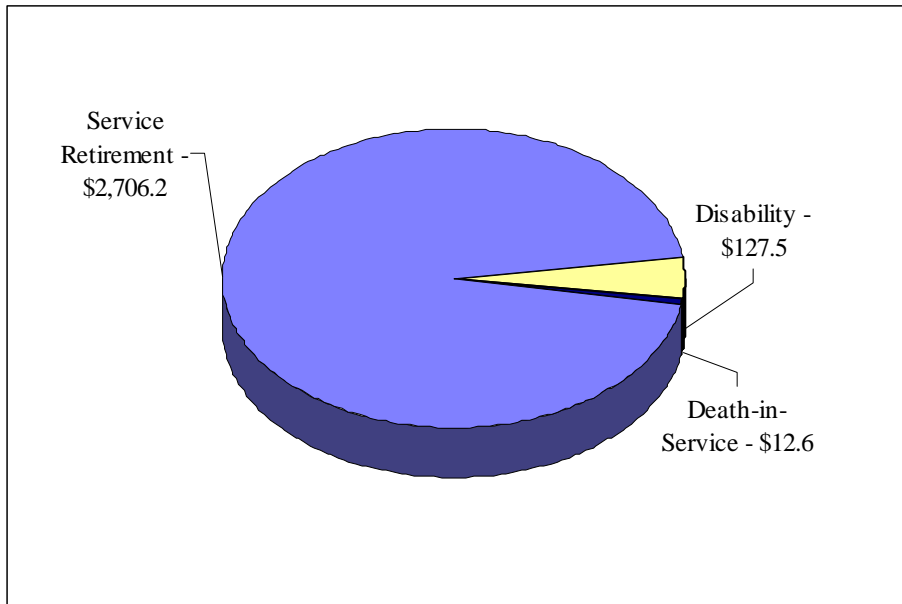
Year	Number	\$ Millions			Ratio	Change in	
		Annual Annuities	Fund Balance	Actuarial Reserve		Annuities	CPI
1983	13,598	\$ 25.9	\$ 289.4	\$ 245.0	1.181	18.0 %	3.8 %
1984	14,520	34.2	329.2	327.5	1.005	0.0 %	4.0 %
1985	15,529	38.0	463.1	366.6	1.263	26.0 %	3.8 %
1986	16,276	51.8	538.7	498.6	1.080	8.0 %	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 %
<b>22-Year Average</b>						<b>6.1 %</b>	<b>3.1 %</b>
<b>10-Year Average</b>						<b>5.0 %</b>	<b>2.4 %</b>

## HISTORY OF % CHANGES IN ANNUITIES AND CPI



**ANNUITIES BEING PAID BY TYPE**  
**DECEMBER 31, 2004**  
**\$ MILLIONS**

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**ANNUITIES BEING PAID DECEMBER 31, 2004**  
**TABULATED BY YEAR OF RETIREMENT**  
**(\$1,000S ANNUALLY)**

Year Ret'd	Fixed Annuities				Variable Annuities				Avg. Total Annuity
	No.	Initial	Increases	Total	No.	Initial	Increases	Total	
2004	7,305	\$ 174,238	\$ 0	\$ 174,238	1,905	\$ 19,925	\$ 0	\$ 19,925	\$26,579
2003	7,831	186,663	1,436	188,099	1,794	16,521	4,123	20,644	26,656
2002	7,404	161,808	2,259	164,067	1,650	22,443	(1,957)	20,486	24,926
2001	7,560	156,080	5,031	161,111	1,790	33,327	(7,167)	26,160	24,771
2000	7,625	145,959	11,800	157,759	1,640	37,119	(11,193)	25,926	24,090
1999	6,550	103,594	26,695	130,289	1,401	25,429	(3,940)	21,489	23,172
1998	6,526	93,821	32,179	126,000	1,404	21,547	(1,154)	20,393	22,432
1997	5,584	75,068	33,401	108,469	1,211	15,195	1,789	16,984	22,467
1996	5,658	73,412	40,020	113,432	1,235	13,257	3,605	16,862	23,028
1995	5,232	64,310	40,888	105,198	1,159	10,085	5,180	15,265	23,024
1994	4,737	55,730	38,888	94,618	1,126	9,736	4,432	14,168	22,965
1993	4,519	48,981	37,670	86,651	1,084	7,690	4,720	12,410	21,921
1992	3,977	41,108	34,786	75,894	951	6,390	4,442	10,832	21,807
1991	3,766	36,223	34,341	70,564	909	5,082	5,078	10,160	21,435
1990	5,993	61,958	64,316	126,274	1,589	10,151	7,321	17,472	23,986
1989	4,602	46,849	55,879	102,728	1,133	6,261	6,237	12,498	25,038
1988	3,735	30,768	41,493	72,261	945	4,222	5,377	9,599	21,917
1987	3,434	25,777	39,078	64,855	910	3,862	4,401	8,263	21,292
1986	3,268	23,732	40,838	64,570	854	3,398	4,448	7,846	22,159
1985	3,092	22,799	43,862	66,661	796	2,366	4,516	6,882	23,785
1984	2,595	18,041	37,755	55,796	734	2,148	4,104	6,252	23,911
1983	2,427	12,626	28,561	41,187	677	1,686	4,101	5,787	19,355
1982	1,985	8,657	21,821	30,478	538	1,031	3,025	4,056	17,398
1981	1,811	6,721	18,262	24,983	466	790	2,301	3,091	15,501
1980	1,473	4,944	13,956	18,900	413	579	2,175	2,754	14,700
1979	1,180	3,791	11,398	15,189	319	344	1,469	1,813	14,409
1978	1,088	3,149	9,700	12,849	322	325	1,489	1,814	13,477
1977	1,055	2,831	8,925	11,756	320	333	1,453	1,786	12,836
1976	870	2,202	7,108	9,310	242	204	930	1,134	12,005
1975	699	1,667	5,452	7,119	190	136	748	884	11,449
1974	598	1,426	4,742	6,168	154	129	631	760	11,586
1973	450	975	3,232	4,207	129	114	492	606	10,698
1972	365	609	2,097	2,706	81	74	289	363	8,411
1971	206	285	999	1,284	52	37	154	191	7,162
1970	187	267	881	1,148	35	21	108	129	6,827
1969	144	197	678	875	41	26	102	128	6,964
1968	114	134	449	583	19	16	61	77	5,782
1967	99	101	360	461	15	6	31	37	5,033
1966	75	63	231	294	14	7	33	40	4,461
1965	74	68	255	323	5	2	9	11	4,517
Prior	318	212	782	994	18	4	23	27	3,125
<b>Total</b>	<b>126,211</b>	<b>\$1,697,844</b>	<b>\$802,504</b>	<b>\$2,500,348</b>	<b>30,270</b>	<b>\$282,018</b>	<b>63,986</b>	<b>\$346,004</b>	<b>\$22,552</b>

**COMPARISON OF ACTUAL TO EXPECTED DEATHS AMONG RETIRED LIVES  
(NORMAL RETIREMENT ONLY)  
DURING 2004**

Age	Male Deaths			Female Deaths			Total Deaths		
	Actual	Expected	Exposure	Actual	Expected	Exposure	Actual	Expected	Exposure
25-29						1			1
30-34						3			3
35-39			1			7			8
40-44			4			23			27
45-49			17	1		70	1		87
50-54	4	2	760			353	4	2	1,113
55-59	34	42	7,437	21	17	6,807	55	59	14,244
60-64	75	91	10,483	49	45	10,301	124	136	20,784
65-69	123	160	10,437	90	85	11,419	213	245	21,856
70-74	215	257	9,228	132	147	10,081	347	404	19,309
75-79	316	348	7,408	208	252	8,920	524	600	16,328
80-84	377	388	4,844	310	364	7,277	687	752	12,121
85-89	281	297	2,357	396	403	4,753	677	700	7,110
90-94	173	150	812	389	334	2,344	562	484	3,156
95-99	48	38	144	172	172	726	220	210	870
100&Up	9	6	17	49	46	124	58	52	141
<b>Totals</b>	<b>1,655</b>	<b>1,779</b>	<b>53,949</b>	<b>1,817</b>	<b>1,865</b>	<b>63,209</b>	<b>3,472</b>	<b>3,644</b>	<b>117,158</b>

Average  
Ages

79.6      78.7      69.3      84.3      83.9      71.7      83.9      81.5      70.6

# SECTION E



## Appendix



## ACTUARIAL ASSUMPTIONS USED IN 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. The mortality table used in the valuation was the Wisconsin Projected Experience Mortality Table-2002, as adopted by the Board in connection with the 2000-2002 Experience Study. In addition, retired life liabilities in the valuations contain a reserve for mortality improvement. The reserve level used in this valuation was 0.7%.

### SINGLE LIFE RETIREMENT VALUES

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#### Wisconsin Projected Experience Table - 2002 with 5% Interest

Sample Attained Ages	Present Value of \$1 Monthly for Life		Future Life Expectancy (years)	
	Males	Females	Males	Females
40	\$204.60	\$213.51	40.3	45.1
45	194.52	205.50	35.5	40.3
50	182.57	195.63	30.8	35.4
55	168.60	183.57	26.3	30.7
60	152.23	168.96	21.9	26.1
65	133.38	151.77	17.8	21.6
70	113.07	131.92	14.0	17.3
75	92.87	110.50	10.7	13.4
80	73.24	89.29	7.9	10.1
85	56.59	69.03	5.8	7.3

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

Sample Attained Ages	Present Value of \$1 Monthly for Life		Future Life Expectancy (years)	
	Males	Females	Males	Females
40	\$183.98	\$195.34	31.3	35.6
45	169.92	183.77	26.7	30.9
50	154.02	169.96	22.4	26.4
55	136.46	153.62	18.3	22.0
60	116.83	134.58	14.5	17.7
65	95.34	113.44	11.0	13.8
70	73.99	90.47	8.0	10.2
75	55.14	68.00	5.6	7.2
80	38.40	48.81	3.7	4.9
85	26.03	33.04	2.4	3.1

## ***POST-RETIREMENT ADJUSTMENTS***

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### **FIXED ANNUITIES - 40.27(2)**

“FIXED ANNUITY RESERVE SURPLUS DISTRIBUTIONS. Surpluses in the fixed 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 fixed 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 fixed 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 fixed 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**

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**1. 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.

**2. Adjustment to Relate Earnings to Averaged Fixed Annuity Balance**

Item 3 below minus Item 1 above.

**3. 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.

**4. Expected Dividend (Variable Change) before Adjustments**

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

**5. 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 3 and 4 are based on average (approximately mid-year) balances, this adjustment is needed so that the final rate will be based on end of year liabilities.

**6. 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.

**7. 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 0.4% and grades to 1% 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.

**8. 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.

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

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**9. 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.

**10. 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.

**11. 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 1) by making the adjustments in items 4 through 10.



**Gabriel, Roeder, Smith & Company**  
Consultants & Actuaries

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March 1, 2005

Mr. David Stella  
Wisconsin Department of Employee Trust Funds  
P.O. Box 7931  
Madison, Wisconsin 53707

Re: Retired Life Actuarial Valuation

Dear Dave:

Enclosed are 75 copies of the report of the December 31, 2004 Retired Life Actuarial Valuation.

Sincerely,

A handwritten signature in black ink that reads "Norman L. Jones". The signature is written in a cursive style with a large initial 'N'.

Norman L. Jones

NLJ/lr  
Enclosures