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Report on Thirty Year Projections of the Mississippi Retirement Systems

Prepared as of June 30, 2016

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December 8, 2016

Board of Trustees
Public Employees' Retirement System of Mississippi
429 Mississippi Street
Jackson, MS 39201-1005

Ladies and Gentlemen:

Presented in this report are the results of 30 year projections of the Public Employees' Retirement System (PERS) of Mississippi, the Highway Safety Patrol Retirement System (HSPRS) and the Supplemental Legislative Retirement Plan (SLRP). The purpose of the projection study is to develop a forecast of the Systems' funding progress over time and to review funding goals and benchmarks outlined in the funding policies that were adopted by the Board at the October 23, 2012 Board meeting for PERS and SLRP and the June 19, 2013 Board meeting for HSPRS.

The projections are based on the June 30, 2016 valuations of PERS, HSPRS and SLRP. Membership was projected over a 30 year period from that date and actuarial valuations were performed annually for each of the 30 years to measure the Systems' funding progress.

The Executive Summary provides a summary of the main projection results. We certify that we are members of the American Academy of Actuaries and that we meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained in this report.

Respectfully submitted,

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TABLE OF CONTENTS

Section I - Executive Summary

Since 1985, the benefit structure of the Public Employees Retirement System (PERS) of Mississippi has undergone significant changes as noted in the table below (the entire HSPRS history of benefit modifications is listed in Appendix C).

Fiscal Year Beginning	Benefit Modifications
July 1, 1985	• Final average compensation calculated using the highest four consecutive years (reduced from highest five consecutive years) • Liberalized survivor benefit provision to reduce the marriage requirement from 5 years to 1 year and to allow a member to designate a child as beneficiary • Minimum benefit increased from $5.00 to $7.50 per month for each year of creditable service for current and future retirees • Eligibility for service retirement reduced from 10 years to 4 years at age 60 • Established "discretionary" COLA provision in addition to the base COLA provision to be paid to eligible retirees based on sufficient actuarial gains • 3% ad hoc increase for all retirees
July 1, 1986	• Eligibility for non-duty related disability retirement reduced from 10 years to 4 years • Permanent exemption from 3% penalty for those required to retire at age 60 • Retirement incentive granted – one additional year of credit to any member with 30 years of service credit or age 60
July 1, 1987	• Established service retirement eligibility based on 25 & out with reduced benefits • Benefit accrual increased from 1-5/8% to 1-3/4% for the first 20 years • Minimum benefit increased from $7.50 to $10.00 per month for each year of service for current and future retirees • 5% ad hoc increase for all retirees • Provided elected official leave credit
July 1, 1989	• Unreduced retirement at age 55 with 25 years of service • Benefit accrual increased from 1-3/4% to 1-7/8% for the first 30 years of service • Unreduced retirement lowered from age 65 to age 60 • 5% ad hoc increase for all retirees
July 1, 1990	• Provided that base COLA percentage granted shall be cumulative from year to year
July 1, 1991	• Unreduced retirement at any age with 25 years of service • Benefit accrual increased to 2% for all years of service over 25

Fiscal Year Beginning	Benefit Modifications
July 1, 1992	• Ad hoc increase for those retired prior to July 1, 1991, with more than 25 years of service • Tiered disability benefit • Expanded survivor benefits to include automatic spousal and dependent child benefits • Liberalized definition of average compensation to provide that the highest four years did not have to be consecutive years • Expanded military service credit to include all active duty military • Removed reference to "Governor's Salary" and established maximum compensation cap at $125,000
July 1, 1994	• Benefits for all retirees under Options 2(5) and 4A(5) were recalculated to remove the reduction imposed for the right to revert to the Maximum
July 1, 1999	• Benefit accrual increased from 2% to 2-1/4% for all years of service over 25 for current and future retirees • Base COLA increased to 3% simple up to age 55 and 3% compounded after age 55 • Reemployed retiree COLA will be based on all fiscal years in retirement, not just the fiscal years in retirement since the last retirement. • Provided that the COLA will be prorated and paid to the beneficiary of a retiree or beneficiary who is receiving the COLA in a lump sum and who dies between July 1 and December 1
July 1, 2000	• Benefit accrual increased from 1-7/8% to 2% for all years of service over 10 and less than 25 for current and future retirees
July 1, 2001	• Benefit accrual increased from 1-7/8% to 2% for all years of service over 5 and less than 25 for current and future retirees
July 1, 2002	• Benefit accrual increased from 1-7/8% to 2% for all years of service up to and including 25 and from 2-1/4% to 2-1/2% for all years of service over 25 for current and future retirees • Increased maximum compensation cap to $150,000 • Provided for free active duty military service for pre-1972 service in the Commissioned Corps of the U.S. Public Health Service for those retiring on or after July 1, 2002 • Reemployed retiree who has previously been retired for at least one full fiscal year no longer has to wait another full fiscal year for his or her COLA to resume • A local county or municipal elected official who is receiving retirement benefits may receive a salary for the elected position that does not exceed 25% of the retiree's average compensation

Fiscal Year Beginning	Benefit Modifications
July 1, 2004	• Removed remarriage penalty on certain spouse / survivor benefits and provided upon application for the reinstatement of spouse survivor benefits previously terminated due to remarriage
July 1, 2008	• Maximum reportable earned compensation was increased from $150,000 to $230,000 to coincide with the compensation limit set pursuant to Section 401(a)(17) of the Internal Revenue Code • Vesting requirement for those employees hired on or after July 1, 2007 was increased from 4 to 8 years of service.
July 1, 2010	• Members who retire on or after July 1, 2010 receive additional credit toward retirement for one-half day of leave for each full fiscal year of membership service accrued after June 30, 2010 • Option 4, a 75% joint and survivor annuity, made available to members who retire on or after January 1, 2011
July 1, 2011	• For members hired on or after July 1, 2011, 30 years of creditable service will be required for retirement regardless of age. • For members hired on or after July 1, 2011, 33 years of creditable service will be required to select a partial lump sum option at retirement. • For members hired on or after July 1, 2011, the retirement formula will be 2% of average compensation for the first 30 years of creditable service plus 2.5% of average compensation for each year beyond 30 years of creditable service. • For members hired on or after July 1, 2011, the actuarial reduction for early retirement will be the lesser of the number of years below 30 years of creditable service or the number of years in age a member is below age 65. • For members hired on or after July 1, 2011, the COLA will be a simple 3% of the annual retirement allowance at retirement up to the fiscal year in which the retired member reaches age 60. Thereafter, the COLA will be a compounded 3% for all future years.
July 1, 2016	• The interest rate on employee contributions shall be calculated based on the money market rate as published by the Wall Street Journal on December 31 of each preceding year with a minimum rate of one percent and a maximum rate of five percent.

Between 1985 and 2005, there was only one increase in the employer contribution rate from 8.75% to 9.75% effective January 1, 1990. However since that times, the employer contribution rate has increased from 9.75% to 15.75%. In addition, the employee contribution rate was increased from 6.00% to 6.50% effective July 1, 1989, to 7.25% effective July 1, 1991 and to 9.00% effective July 1, 2010.

Since 1986, PERS' assets have experienced better than assumed investment returns overall. However, the negative returns for the 2008 and 2009 fiscal years have caused the employer contribution rates to increase and the funding ratio to decrease. The ten year rolling returns have been:

Ten Year Period Ending June 30	Ten Year Annualized Rate of Return
1986	9.7%
1987	9.3
1988	9.6
1989	10.3
1990	11.5
1991	13.6
1992	14.2
1993	12.4
1994	12.2
1995	11.3
1996	10.7
1997	11.6
1998	13.2
1999	12.9
2000	12.7
2001	10.8
2002	8.6
2003	7.8
2004	9.1
2005	8.4
2006	8.0
2007	7.9
2008	5.1
2009	1.7
2010	2.3
2011	5.4
2012	6.1
2013	7.1
2014	7.5
2015	6.9
2016	5.9

Section I - Executive Summary

The following report is being provided to the Board of Trustees of the Public Employees' Retirement System of Mississippi to provide a forecast of the funding progress over time and to review funding goals and benchmarks outlined in the current funding policies that were adopted for PERS and SLRP by the PERS Board and adopted for HSPRS by the HSPRS Administrative Board. The objective of the current funding policies is to accumulate sufficient assets during a member's employment to fully finance the benefit the member receives throughout retirement. In order to reach that objective, some goals and benchmarks were established as follows:

- To maintain an increasing funding ratio and reach an 80% minimum funding ratio in the year 2042;
- To develop a pattern of stable contribution rates (15.75% of payroll for PERS, 37.00% of payroll for HSPRS and 7.40% of payroll for SLRP) with a minimum employer contribution equal to the normal cost under the Entry Age Normal Cost Method.

In order to meet these funding goals and benchmarks, 30 year projections are necessary to determine whether the funding ratio target of 80% can be reached in the year 2042.

For PERS and SLRP, if the projected funded ratio is less than 60% in 2042 or less than 75% following two consecutive projection reports, a contribution rate increase will be determined that is sufficient to generate a funded ratio of 85% in 2042. If a funded ratio of 100% or more is attained and is projected to remain above 100% for the ensuing 30 years following two consecutive annual projection reports, a reduced contribution pattern will be established provided the funded ratio remains at or above 100% in every future year.

For HSPRS, if the projected funded ratio is less than 60% in 2042 or less than 70% following three consecutive projection reports, a contribution rate increase will be determined that is sufficient to generate a funded ratio of 90% in 2042. If a funded ratio of 100% or more is attained and is projected to remain above 100% for the ensuing 30 years following three consecutive annual projection reports, a reduced contribution pattern will be established provided the funded ratio remains at or above 100% in every future year. Please note that the projections for HSPRS include additional contributions estimated at $3.7 million to be made in perpetuity due to Senate Bill No. 2659 (enacted in 2004) and House Bill No. 1015 (enacted in 2013).

The results of the 30 year projections for each of the PERS, HSPRS and SLRP plans are shown in the next 3 sections of the report. This projection report reflects the assumption changes that were adopted by the PERS Board of Trustees in April, 2015. Furthermore, for the June 30, 2016 valuation, the assumed rate of interest credited to employee contributions was changed from 3.50% to 2.00%.

Regular actuarial valuations measure the Systems present financial position and contribution adequacy by calculating and financing the liabilities created by the present benefit program. This process involves discounting to present values the future benefit payments on behalf of present active and retired members and their survivors. However, valuations do not produce information regarding future changes in the makeup of the covered group or the amounts of benefits to be paid or investment income to be received – actuarial projections do provide this information.

Whereas valuations provide a snapshot of the System as of a given date, projections provide a moving forecast. Projected active and retired groups are developed from year to year by the application of assumptions regarding pre-retirement withdrawal from service, retirements, deaths, disabilities, and the addition of new members. Projected information regarding the retired life group leads to assumed future benefit payouts. Performing actuarial valuations every year during the projection period generates expected contribution rates and unfunded accrued liability (UAL) amortization periods. Combining future benefit payments with assumed contributions based on periodic valuations of the projected membership and expected investment earnings produces the net cash flow of the System each year, and thus end of year asset levels. Finally, the valuation results permit the development of the funding ratio trend line for the entire projection period.

Projections are used for many purposes. Among them are (i) developing cash flow patterns for investment policy and asset mix consideration, (ii) exploring the effect of alternative assumptions about future experience, and (iii) analyzing the impact on plan funding progress of changes in the workforce.

Projection results are useful in demonstrating changing relationships among key elements affecting plan financial activity (e.g., how benefits payable and plan assets will grow in future decades). Projections are not predictions of specific future events and do not provide numeric precision in absolute terms. For instance, cash flow projected to occur 10 years in the future will not be exact (except by coincidence), but understanding the changed relationship between future benefit payout and future investment income can be very useful.

The projection of System finances over 30 years requires an assumption regarding future new entrants to the Systems as well as the regular valuation assumptions used to estimate the timing of future events for current members. As members are assumed to terminate service for any reason, they are replaced with a sufficient number of new entrants to keep the active population constant in number. Valuations are then performed on the projected active and retired membership for each of the thirty years of the study.

Section I - Executive Summary

The main results from the study (details can be found in the following sections of this report) are noted on the following pages.

For PERS:

- Utilizing the funding policy for PERS, with a fixed contribution rate of 15.75% for the length of the projection period, the projection results for 2016 show that the Plan will have a funding ratio of 62.6% in 2042. During last year's study, the funding ratio in 2042 was 80.6%. The main reason for the decrease was the market value loss that occurred in the 2016 fiscal year. We have assumed that the fund will earn 7.75% for each of the projection years and that the actuarial assumptions in the back of this report are experienced.

- **This result meets the funding goals and benchmarks set by the Board in the current funding policy and no change in the employer contribution rate is necessary at this time. However, we will note that this is the first year in which the projected funding ratio in 2042 is below the 75% benchmark and according to the PERS' funding policy, if the funding ratio in 2042 in next year's projection report does not increase above 75%, an increase in the fixed contribution rate may be needed beginning in 2018.**

For HSPRS:

- Utilizing the funding policy for HSPRS, with a fixed contribution rate of 37.00% for the length of the projection period, the projection results for 2016 show that the Plan will have a funding ratio of 51.6% in 2042. During last year's study, the funding ratio in 2042 was 68.6%. Again, the main reason for the decrease was the market value loss that occurred in the 2016 fiscal year. This is the second year in which the funding ratio in 2042 is below the 70% benchmark and the first year the funding ratio in 2042 is below the 60% benchmark. We have assumed that the fund will earn 7.75% for each of the projection years and that the actuarial assumptions in the back of this report are experienced.

- **Since the funding ratio in 2042 is below the 60% benchmark, this result does not meet the funding goals and benchmarks set by the HSPRS Administrative Board in the current funding policy and an increase in the employer contribution rate is necessary at this time.**

For SLRP:

- Utilizing the funding policy for SLRP, with a fixed contribution rate of 7.40% for the length of the projection period, the projection results for 2016 show that the Plan will have a funding ratio of 92.3% in 2042. We have assumed that the fund will earn 7.75% for each of the projection years and that the actuarial assumptions in the back of this report are experienced. **This result meets the funding goals and benchmarks set by the Board in the current funding policy and no change in the employer contribution rate is necessary at this time.**

- If the long-term investment return assumption is lowered to 7.50%, the funding ratio in 2042 is projected to still be above 75.0%, therefore, meeting the funding goals and benchmarks.

It must be kept in mind that projections do not purport to show exact numerical results over the entire period under study. They do however provide a good basis for drawing conclusions about the likely position of the Systems and the relative impact changes over the years will have on System finances. Below are two tables showing the projected funding ratios in 2042 for each plan comparing last year's and this year's results and another table showing the 2016 results under alternative investment return scenarios.

Summary of Funding Ratios in 2042

System	2015 Baseline Projection (7.75%)	2016 Baseline Projection (7.75%)
PERS	80.6%	62.6%
HSPRS	68.6%	51.6%
SLRP	111.8%	92.3%

2016 Summary of Funding Ratios in 2042

System	7.75% Assumption	8.00% Assumption	7.50% Assumption	7.25% Assumption
PERS	62.6%	73.1%	53.5%	45.1%
HSPRS	51.6%	61.6%	42.6%	34.6%
SLRP	92.3%	105.5%	80.3%	69.4%

SPECIAL ASSUMPTIONS

In addition to the regular valuation assumptions used in performing the annual actuarial valuations of PERS (all assumptions utilized in the projection study are outlined in Appendix A), additional assumptions must be made that are unique to projections. The first of these is what, if any, change in the overall active membership will be anticipated. For this projection study it was assumed that the number of active members would remain static over the 30 year projection period.

But since we assume active members will leave the system through termination, death, disability or retirement, we need to make some assumptions as to the composition of new hires that will replace departing members in order to maintain the membership at a constant number. The new entrant profile we developed was based on the new hires over the 3 year period prior to the projection start date of June 30, 2016. That profile is summarized in the table on the following page.

Age	Average Pay	Percent Male	Weight
19	$25,500	56%	1.0%
23	27,700	39	20.4
27	30,900	36	21.6
32	30,900	34	13.5
37	31,300	32	10.8
42	30,600	33	9.0
47	30,600	38	7.6
52	30,800	40	6.7
57	30,800	43	5.1
62	30,900	48	2.7
69	27,100	63	1.6

For the projection results presented in this section of the report, it was further assumed that the benefit structure as it exists on June 30, 2016 would remain in place for the following 30 years.

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FUTURE MEMBERSHIP

The following chart and graph show the headcounts of active participants and retired members over the projection period. The actives are broken down into those existing as of June 30, 2016 and those who are hired after June 30, 2016. Since the membership at PERS has been fluctuating up and down over the past few years, we have assumed the active membership will continue at its current population of 154,104 active members over the projected period. By the end of the projection period we estimate that about 98% of those active employees will have been hired after June 30, 2016 and be included in the Tier 4 benefit structure. After about 13 years, the retiree headcount begins to drop as less current and future active members are expected to reach retirement eligibility.

Member	2016	2021	2031	2042	2046
Active – Existing Employees	154,104	91,215	29,353	5,790	2,448
Active – New Entrants	0	62,889	124,751	148,314	151,656
Retired	99,483	108,388	112,542	96,560	88,654
Total	253,587	262,492	266,646	250,664	242,758

RESULTS

The projection of payroll, UAL, Employer normal cost rates, UAL Rate, Total Rate and Funding Ratios follows for the baseline assumptions as per the Funding Policy. In addition, the projection results using different long-term investment return assumptions for future valuations (8.00%, 7.50% and 7.25%) are included.

Baseline Projection Results (7.75%)
($000's)

	2016	2021	2031	2042	2046
Total Payroll	$6,022,533	$7,040,203	$9,753,694	$14,507,927	$16,818,686
UAL	$16,812,435	$20,444,746	$25,223,586	$25,633,304	$22,600,367
Normal Cost Rate	2.20%	1.70%	1.16%	1.00%	0.98%
UAL Rate	13.55%	14.05%	14.59%	14.75%	14.77%
Total Rate	15.75%	15.75%	15.75%	15.75%	15.75%
Funding Ratio	60.0%	57.8%	57.2%	62.6%	69.2%
Amortization Period	37 years	40 years	29 years	16 years	11 years

Projection Results Assuming 8.00% Long-Term Investment Return
($000's)

	2016	2021	2031	2042	2046
Total Payroll	$6,022,533	$7,040,203	$9,753,694	$14,507,927	$16,818,686
UAL	$16,812,435	$18,810,725	$21,882,175	$17,956,161	$12,086,673
Normal Cost Rate	2.20%	1.22%	0.73%	0.57%	0.55%
UAL Rate	13.55%	14.53%	15.02%	15.18%	15.20%
Total Rate	15.75%	15.75%	15.75%	15.75%	15.75%
Funding Ratio	60.0%	60.1%	61.9%	73.1%	83.1%
Amortization Period	37 years	33 years	23 years	10 years	6 years

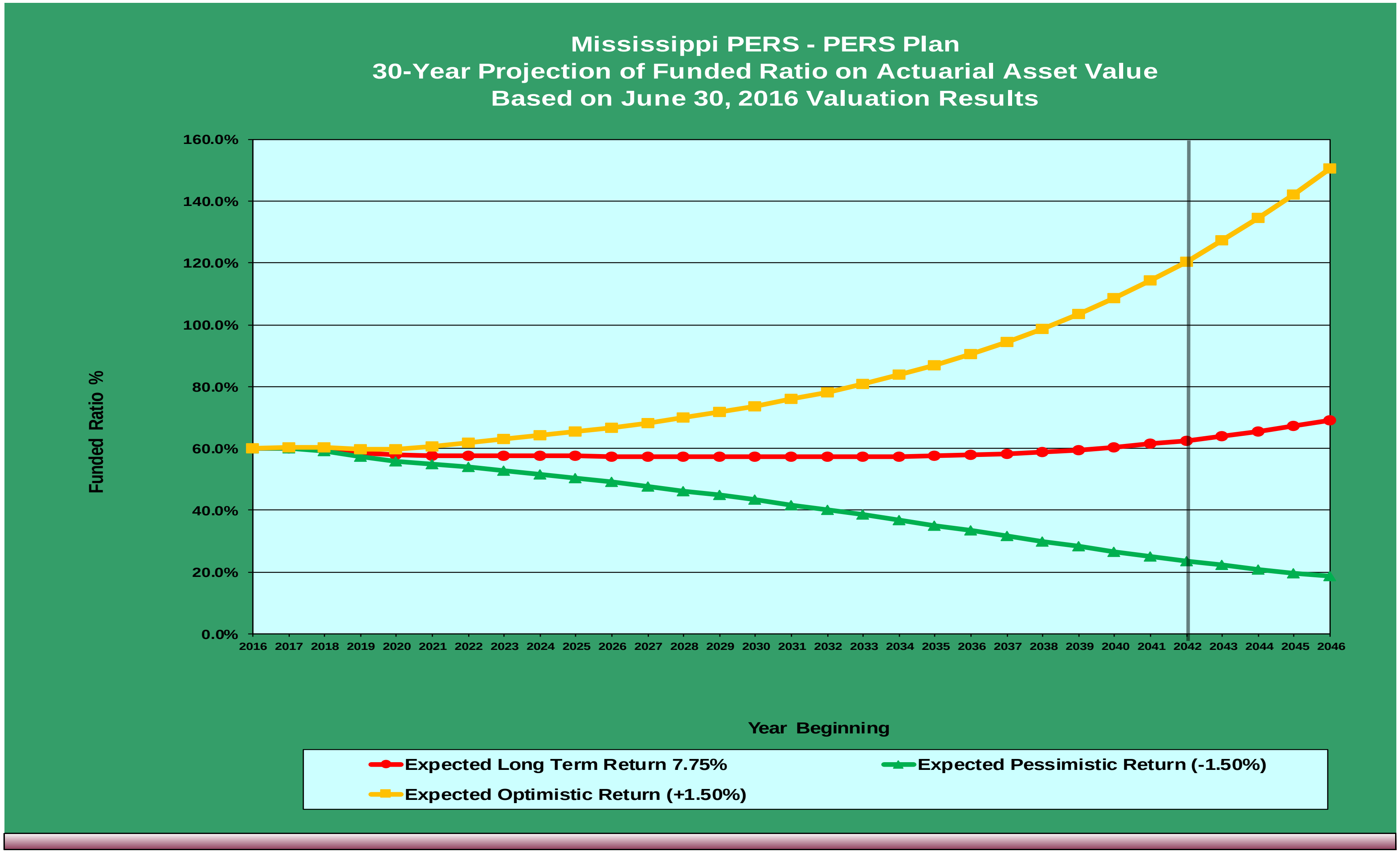
Projection Results Assuming 7.50% Long-Term Investment Return
($000's)

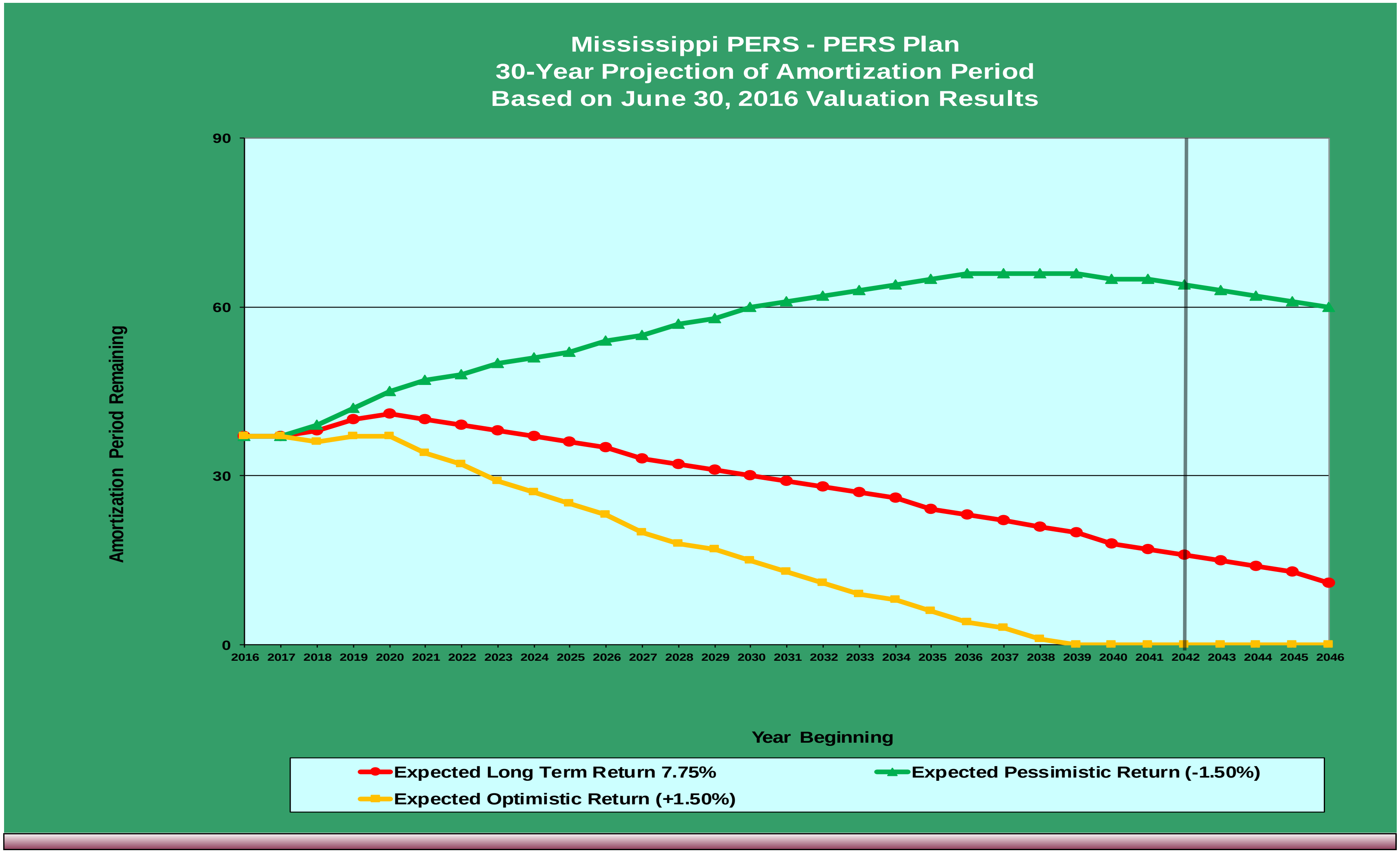
	2016	2021	2031	2042	2046
Total Payroll	$6,022,533	$7,040,203	$9,753,694	$14,507,927	$16,818,686
UAL	$16,812,435	$22,062,953	$28,421,532	$32,682,545	$32,110,191
Normal Cost Rate	2.20%	2.21%	1.64%	1.47%	1.45%
UAL Rate	13.55%	13.54%	14.11%	14.28%	14.30%
Total Rate	15.75%	15.75%	15.75%	15.75%	15.75%
Funding Ratio	60.0%	55.6%	52.9%	53.5%	57.4%
Amortization Period	37 years	48 years	36 years	23 years	18 years

Projection Results Assuming 7.25% Long-Term Investment Return
($000's)

	2016	2021	2031	2042	2046
Total Payroll	$6,022,533	$7,040,203	$9,753,694	$14,507,927	$16,818,686
UAL	$16,812,435	$23,804,722	$31,731,546	$39,649,937	$41,351,317
Normal Cost Rate	2.20%	2.80%	2.18%	2.00%	1.98%
UAL Rate	13.55%	12.95%	13.57%	13.75%	13.77%
Total Rate	15.75%	15.75%	15.75%	15.75%	15.75%
Funding Ratio	60.0%	53.4%	48.8%	45.1%	46.6%
Amortization Period	37 years	59 years	46 years	32 years	27 years

The following graphs show a comparison of the projected funding ratios and amortization periods for the baseline valuation (assuming 7.75%) and two alternative investment return scenarios to show an optimistic view if the fund earns 1.50% above the assumed rate each year of the projection study and a pessimistic view if the fund earns 1.50% less than the assumed rate each year of the projection study. As can be seen from the graphs, even under a pessimistic view of investment returns, the Plan remains solvent over the length of the projection period.


Mississippi PERS - PERS Plan
30-Year Projection of Funded Ratio on Actuarial Asset Value
Based on June 30, 2016 Valuation Results
Funded Ratio %
160.0%
140.0%
120.0%
100.0%
80.0%
60.0%
40.0%
20.0%
0.0%
2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038 2039 2040 2041 2042 2043 2044 2045 2046
Year Beginning
Expected Long Term Return 7.75%
Expected Pessimistic Return (-1.50%)
Expected Optimistic Return (+1.50%)



Mississippi PERS - PERS Plan
30-Year Projection of Amortization Period
Based on June 30, 2016 Valuation Results
90
60
30
0
Amortization Period Remaining
2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038 2039 2040 2041 2042 2043 2044 2045 2046
Year Beginning
Expected Long Term Return 7.75%
Expected Pessimistic Return (-1.50%)
Expected Optimistic Return (+1.50%)

SPECIAL ASSUMPTIONS

In addition to the regular valuation assumptions used in performing the annual actuarial valuations of HSPRS (all assumptions utilized in the projection study are outlined in Appendix B), additional assumptions must be made that are unique to projections. The first of these is what, if any, change in the overall active membership will be anticipated. For this projection study it was assumed that the number of active members would remain static over the 30 year projection period.

But since we assume active members will leave the system through termination, death, disability or retirement, we need to make some assumptions as to the composition of new hires that will replace departing members in order to maintain the membership at a constant number. The new entrant profile we developed was based on the new hires over the 3 year period prior to the projection start date of June 30, 2016. That profile is summarized in the table below.

Age	Average Pay	Percent Male	Weight
22	$40,000	90%	9.0%
26	40,000	98	37.0
30	40,000	94	26.0
34	41,000	99	15.0
38	42,000	99	3.0
42	43,000	99	5.0
46	45,000	99	5.0

For the projection results presented in this section of the report, it was further assumed that the benefit structure as it exists on June 30, 2016 would remain in place for the following 30 years.

FUTURE MEMBERSHIP

The following chart and graph show the headcounts of active participants and retired members over the projection period. The actives are broken down into those existing as of June 30, 2015 and those who are hired after June 30, 2016. We have assumed the active membership will continue at the current population of 484 active members over the projected period.

Member	2016	2021	2031	2042	2046
Active – Existing Employees	484	366	165	21	4
Active – New Entrants	0	118	319	463	480
Retired	724	854	1,065	1,177	1,193
Total	1,208	1,338	1,549	1,661	1,677

RESULTS

The projection of payroll, UAL, Employer normal cost rates, UAL Rate, Total Rate and Funding Ratios follows for the baseline assumptions as per the Funding Policy. Please note that contributions from SB 2659 and HB 1015 are assumed to continue to provide an additional $3,700,000 annually throughout the projection period under all scenarios. These dollars are in addition to the employer contributions as a percent of payroll shown below. In addition, the projection results using different long-term investment return assumptions for future valuations (8.00%, 7.50% and 7.25%) are included.

Baseline Projection Results (7.75%)
($000's)

	2016	2021	2031	2042	2046
Total Payroll	$27,380	$31,412	$40,433	$58,005	$67,267
UAL	$169,207	$206,913	$284,689	$421,383	$488,909
Normal Cost Rate	16.67%	16.34%	16.28%	16.10%	16.06%
UAL Rate	20.22%	20.66%	20.72%	20.90%	20.94%
Total Rate	37.00%	37.00%	37.00%	37.00%	37.00%
Funding Ratio	65.8%	63.4%	59.9%	51.6%	48.6%
Amortization Period	43 years	68 years	100 years	100 years	100 years

Please note that a 100 year amortization period on any of the tables represents an infinite amortization period, meaning that the current employer rate would never pay off the Unfunded Accrued Liability.

Projection Results Assuming 8.00% (Long-Term Investment Return)
($000's)

	2016	2021	2031	2042	2046
Total Payroll	$27,380	$31,412	$40,433	$58,005	$67,267
UAL	$169,207	$187,332	$243,065	$326,103	$359,966
Normal Cost Rate	16.67%	14.93%	14.87%	14.70%	14.66%
UAL Rate	20.22%	22.07%	22.13%	22.30%	22.34%
Total Rate	37.00%	37.00%	37.00%	37.00%	37.00%
Funding Ratio	65.8%	66.0%	64.9%	61.6%	61.1%
Amortization Period	43 years	42 years	52 years	48 years	44 years

Projection Results Assuming 7.50% (Long-Term Investment Return)
($000's)

	2016	2021	2031	2042	2046
Total Payroll	$27,380	$31,412	$40,433	$58,005	$67,267
UAL	$169,207	$227,140	$326,251	$512,515	$610,219
Normal Cost Rate	16.67%	17.86%	17.78%	17.60%	17.55%
UAL Rate	20.22%	19.14%	19.22%	19.40%	19.45%
Total Rate	37.00%	37.00%	37.00%	37.00%	37.00%
Funding Ratio	65.8%	60.9%	55.2%	42.6%	37.5%
Amortization Period	43 years	100 years	100 years	100 years	100 years

Projection Results Assuming 7.25% (Long-Term Investment Return)
($000's)

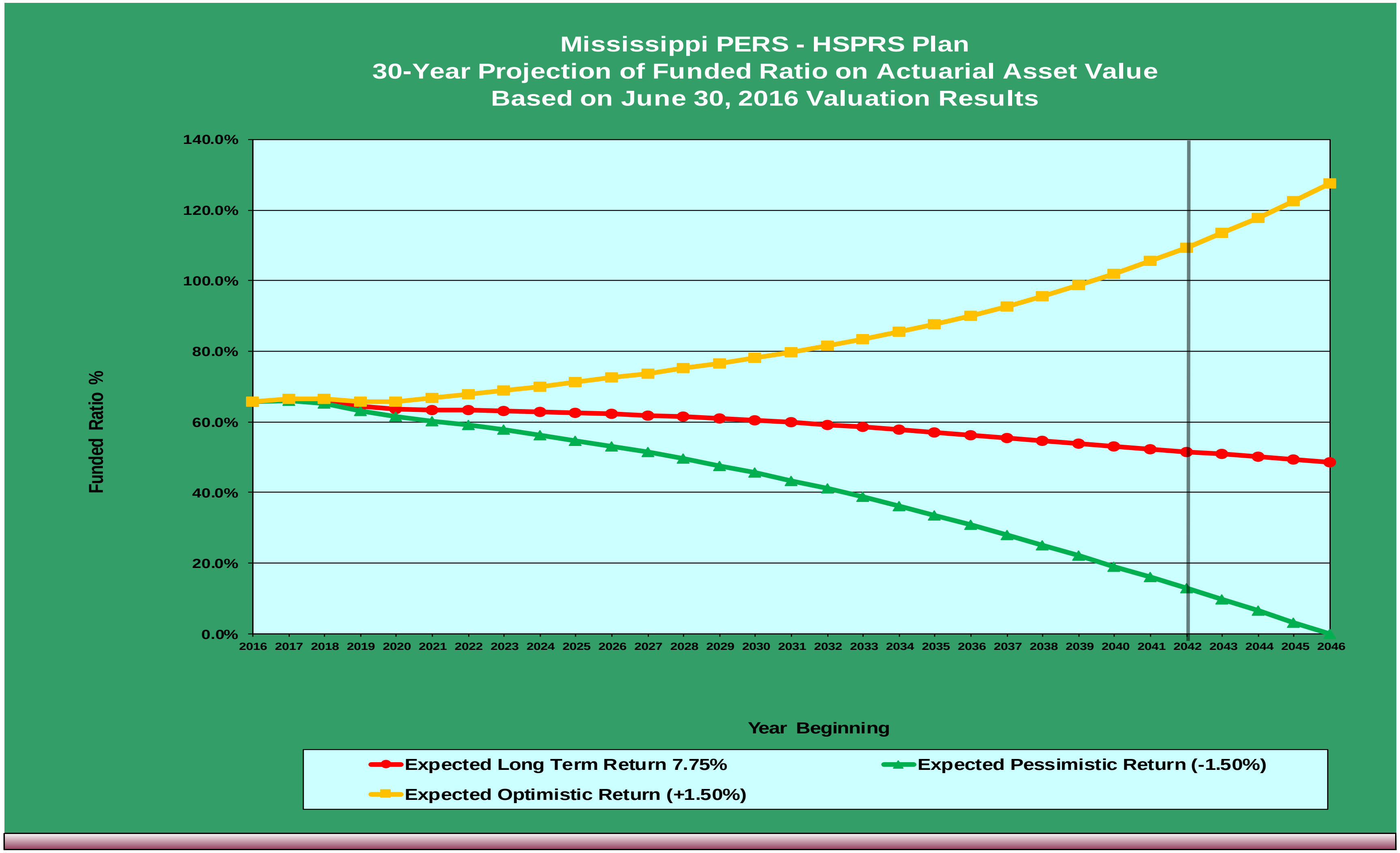
	2016	2021	2031	2042	2046
Total Payroll	$27,380	$31,412	$40,433	$58,005	$67,267
UAL	$169,207	$248,444	$368,276	$600,441	$725,219
Normal Cost Rate	16.67%	19.58%	19.49%	19.29%	19.25%
UAL Rate	20.22%	17.42%	17.51%	17.71%	17.75%
Total Rate	37.00%	37.00%	37.00%	37.00%	37.00%
Funding Ratio	65.8%	58.5%	50.7%	34.6%	27.7%
Amortization Period	43 years	100 years	100 years	100 years	100 years

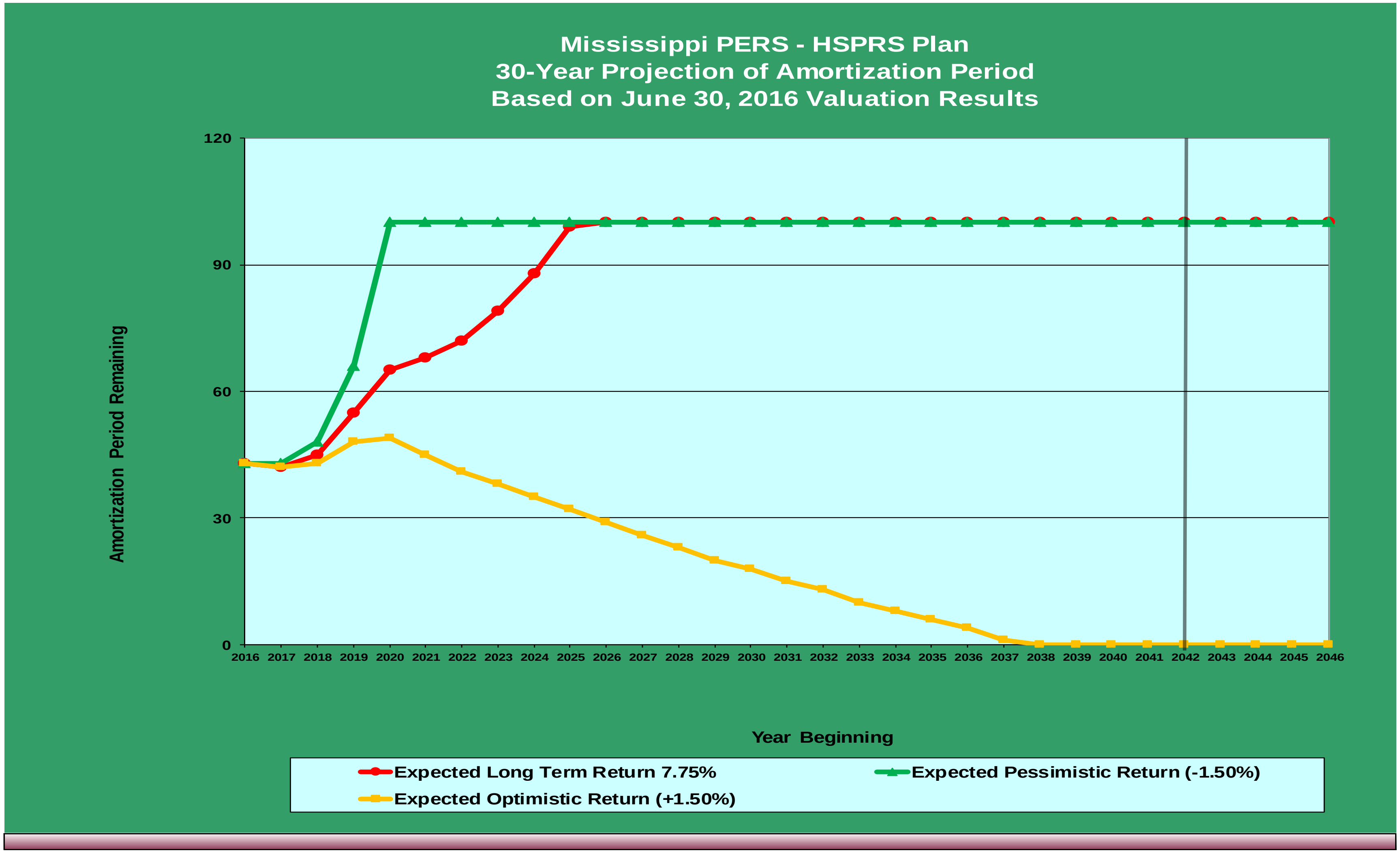
Please note that a 100 year amortization period on any of the tables represents an infinite amortization period, meaning that the current employer rate would never pay off the Unfunded Accrued Liability.

Section III – HSPRS Projection Results

The following graphs show a comparison of the projected funding ratios and amortization periods for the baseline valuation (assuming 7.75%) and two alternative investment return scenarios to show an optimistic view if the fund earns 1.50% above the assumed rate each year of the projection study and a pessimistic view if the fund earns 1.50% less than the assumed rate each year of the projection study. As can be seen from the graphs, under a pessimistic view of investment returns, the Plan is projected to become insolvent near the end of the projection period.

Please note that a 100 year amortization period on any of the graphs represents an infinite amortization period, meaning that the current employer rate would never pay off the Unfunded Accrued Liability.


Mississippi PERS - HSPRS Plan
30-Year Projection of Funded Ratio on Actuarial Asset Value
Based on June 30, 2016 Valuation Results
140.0%
120.0%
100.0%
80.0%
60.0%
40.0%
20.0%
0.0%
Funded Ratio %
2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038 2039 2040 2041 2042 2043 2044 2045 2046
Year Beginning
Expected Long Term Return 7.75%
Expected Pessimistic Return (-1.50%)
Expected Optimistic Return (+1.50%)



Mississippi PERS - HSPRS Plan
30-Year Projection of Amortization Period
Based on June 30, 2016 Valuation Results
Amortization Period Remaining
120
90
60
30
0
2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038 2039 2040 2041 2042 2043 2044 2045 2046
Year Beginning
Expected Long Term Return 7.75%
Expected Pessimistic Return (-1.50%)
Expected Optimistic Return (+1.50%)

Special Assumptions

In addition to the regular valuation assumptions used in performing the annual actuarial valuations of SLRP (all assumptions utilized in the projection study are outlined in Appendix D), additional assumptions must be made that are unique to projections. The first of these is what, if any, change in the overall active membership will be anticipated. For this projection study it was assumed that the number of active members would remain static over the 30 year projection period.

Since we assume active members will leave the system through termination, death, disability or retirement, we need to make some assumptions as to the composition of new hires that will replace departing members in order to maintain the membership at a constant number. The new entrant profile we developed was based on the new hires over the 3 year period prior to the projection start date of June 30, 2016. That profile is summarized in the table below.

Age	Average Pay	Percent Male	Weight
32	$40,000	85.0%	18.0%
38	40,000	85.0	18.0
46	40,000	60.0	22.0
52	40,000	85.0	22.0
57	40,000	85.0	10.0
63	40,000	85.0	10.0

For the projection results presented in this section of the report, it was further assumed that the benefit structure as it exists on June 30, 2016 would remain in place for the following 30 years.

FUTURE MEMBERSHIP

The following chart and graph show the headcounts of active participants and retired members over the projection period. The actives are broken down into those existing as of June 30, 2016 and those who are hired after June 30, 2016. We have assumed the active membership will continue at the current maximum population of 175 active members over the projected period. After about 9 years, the retiree headcount begins to drop as less current and future active members are expected to reach retirement eligibility.

Member	2016	2021	2031	2042	2046
Active – Existing Employees	171	122	58	16	9
Active – New Entrants	0	53	117	159	166
Retired	207	211	176	126	110
Total	378	386	351	301	285

RESULTS

The projection of payroll, UAL, Employer normal cost rates, UAL Rate, Total Rate and Funding Ratios follows for the baseline assumptions according to the new funding policy. In addition, the projection results using different long-term investment return assumptions for future valuations (8.00%, 7.50% and 7.25%) are included.

Baseline Projection Results (7.75%)
($000's)

	2016	2021	2031	2042	2046
Total Payroll	$6,862	$8,167	$11,622	$17,245	$19,933
UAL	$4,812	$6,095	$6,665	$2,766	$(803)
Normal Cost Rate	2.87%	2.70%	2.52%	2.29%	2.23%
UAL Rate	4.53%	4.70%	4.88%	5.11%	5.17%
Total Rate	7.40%	7.40%	7.40%	7.40%	7.40%
Funding Ratio	77.4%	74.9%	77.8%	92.3%	102.1%
Amortization Period	23 years	24 years	16 years	4 years	0 years

Projection Results Assuming 8.00% Long-Term Investment Return
($000's)

	2016	2021	2031	2042	2046
Total Payroll	$6,862	$8,167	$11,622	$17,245	$19,933
UAL	$4,812	$5,314	$4,818	$(1,918)	$(7,371)
Normal Cost Rate	2.87%	2.44%	2.27%	2.06%	2.00%
UAL Rate	4.53%	4.96%	5.13%	5.34%	5.40%
Total Rate	7.40%	7.40%	7.40%	7.40%	7.40%
Funding Ratio	77.4%	77.6%	83.6%	105.5%	119.3%
Amortization Period	23 years	19 years	10 years	0 years	0 years

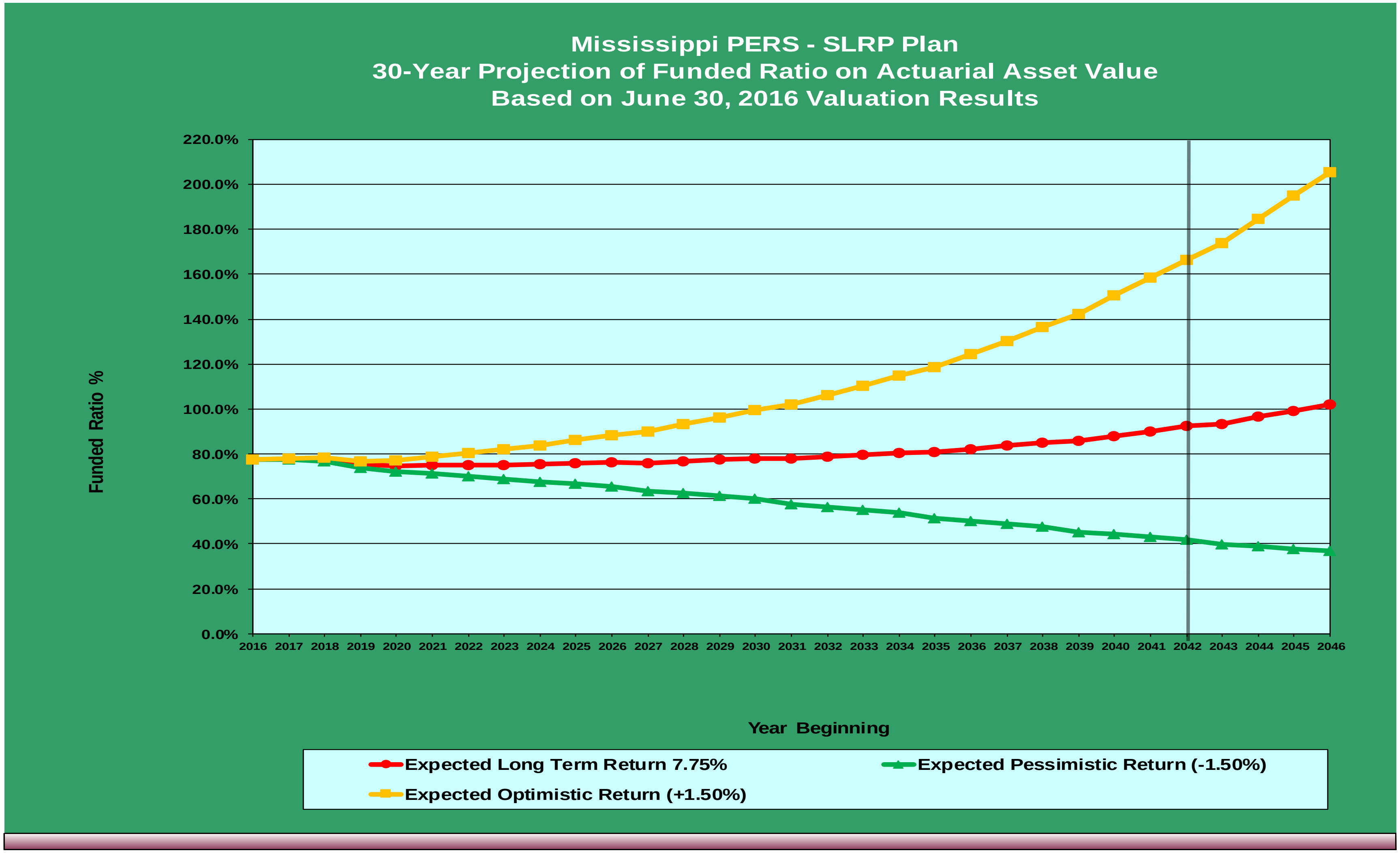
Projection Results Assuming 7.50% Long-Term Investment Return
($000's)

	2016	2021	2031	2042	2046
Total Payroll	$6,862	$8,167	$11,622	$17,245	$19,933
UAL	$4,812	$6,894	$8,492	$7,217	$5,346
Normal Cost Rate	2.87%	2.98%	2.78%	2.54%	2.47%
UAL Rate	4.53%	4.42%	4.62%	4.86%	4.93%
Total Rate	7.40%	7.40%	7.40%	7.40%	7.40%
Funding Ratio	77.4%	72.2%	72.3%	80.3%	86.6%
Amortization Period	23 years	31 years	23 years	11 years	6 years

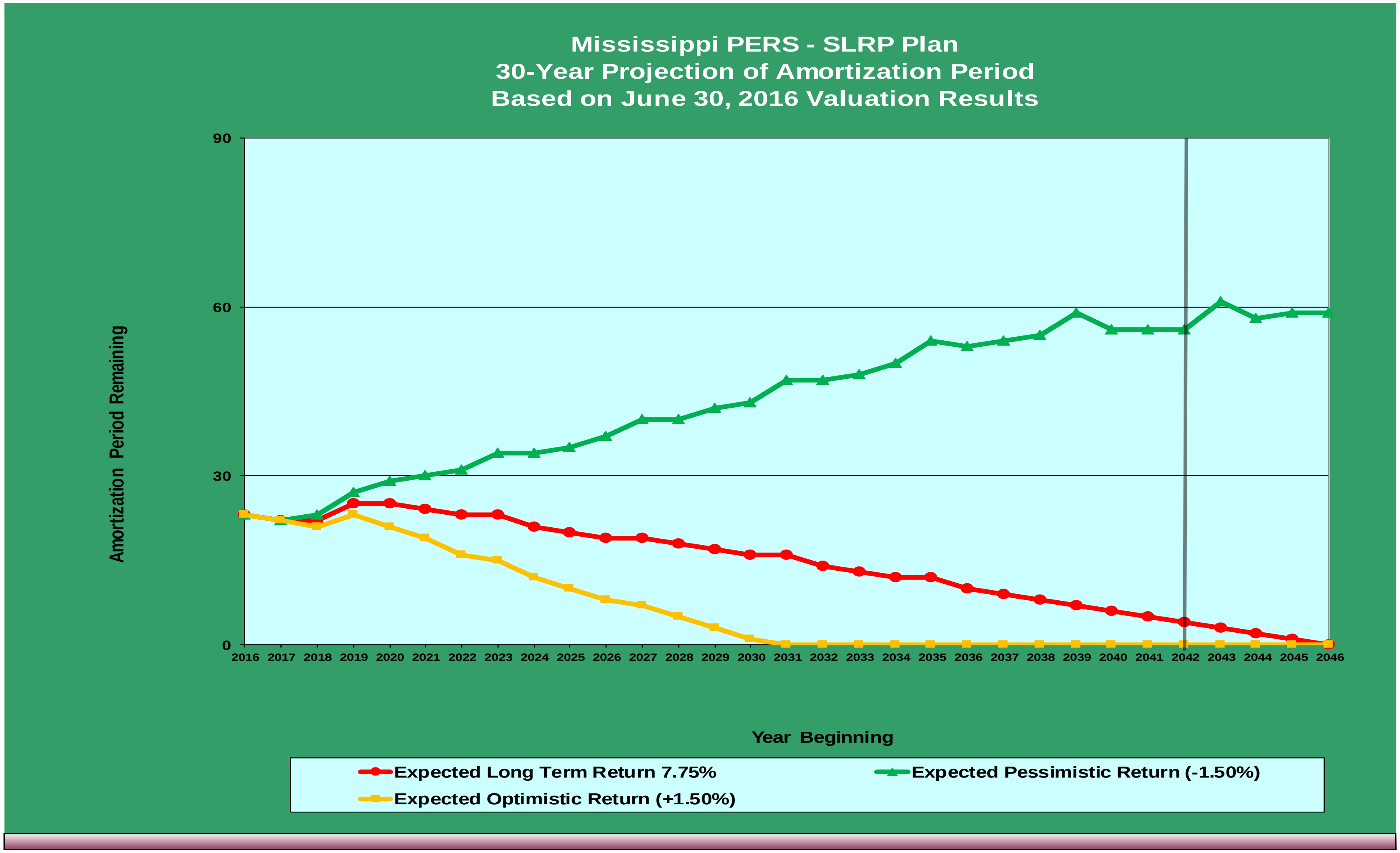
Projection Results Assuming 7.25% Long-Term Investment Return
($000's)

	2016	2021	2031	2042	2046
Total Payroll	$6,862	$8,167	$11,622	$17,245	$19,933
UAL	$4,812	$7,722	$10,310	$11,453	$11,105
Normal Cost Rate	2.87%	3.29%	3.07%	2.81%	2.74%
UAL Rate	4.53%	4.11%	4.33%	4.59%	4.66%
Total Rate	7.40%	7.40%	7.40%	7.40%	7.40%
Funding Ratio	77.4%	69.6%	67.1%	69.4%	72.8%
Amortization Period	23 years	42 years	34 years	20 years	15 years

The following graphs show a comparison of the projected funding ratios and amortization periods for the baseline valuation (assuming 7.75%) and two alternative investment return scenarios to show an optimistic view if the fund earns 1.50% above the assumed rate each year of the projection study and a pessimistic view if the fund earns 1.50% less than the assumed rate each year of the projection study. As can be seen from the graphs, even under a pessimistic view of investment returns, the Plan remains solvent over the length of the projection period.



Mississippi PERS - SLRP Plan
30-Year Projection of Funded Ratio on Actuarial Asset Value
Based on June 30, 2016 Valuation Results
Funded Ratio %
220.0%
200.0%
180.0%
160.0%
140.0%
120.0%
100.0%
80.0%
60.0%
40.0%
20.0%
0.0%
2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038 2039 2040 2041 2042 2043 2044 2045 2046
Year Beginning
Expected Long Term Return 7.75%
Expected Pessimistic Return (-1.50%)
Expected Optimistic Return (+1.50%)


Mississippi PERS - SLRP Plan
30-Year Projection of Amortization Period
Based on June 30, 2016 Valuation Results
Amortization Period Remaining
90
60
30
0
2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038 2039 2040 2041 2042 2043 2044 2045 2046
Year Beginning
Expected Long Term Return 7.75%
Expected Pessimistic Return (-1.50%)
Expected Optimistic Return (+1.50%)

INTEREST RATE: 7.75% per annum, compounded annually (net of investment expense only).

SEPARATIONS FROM ACTIVE SERVICE: Representative values of the assumed rates of separation from active service are as follows:

	Annual Rates of					
	Withdrawal and Vesting*		Death**		Disability**	
Age	Male	Female	Male	Female	Male	Female
20	23.00%	28.00%	0.0159%	0.0054%	0.012%	0.011%
25	16.00	16.50	0.0346	0.0058	0.017	0.014
30	10.00	10.50	0.0318	0.0073	0.020	0.018
35	7.50	8.00	0.0337	0.0096	0.044	0.022
40	6.25	6.50	0.0390	0.0132	0.120	0.090
45	5.75	5.50	0.0513	0.0220	0.240	0.160
50	5.75	5.50	0.0859	0.0369	0.320	0.230
55	5.75	5.50	0.1466	0.0557	0.520	0.400
60	5.75	5.50	0.2391	0.0805	0.520	0.400
65	5.75	5.50	0.4076	0.1214	0.200	0.150
70	5.75	5.50	0.6921	0.2043	0.200	0.150
74	5.75	5.50	1.0147	0.3098	0.200	0.150

	Annual Rates of Service Retirements			
	Male		Female	
Age	Under 25 Years of Service***	25 Years of Service and Over***	Under 25 Years of Service***	25 Years of Service and Over***
45		19.0%		16.0%
50		14.0		12.0
55		18.0		18.0
60	10.0%	20.0	12.5%	22.0
62	20.0	33.0	18.0	36.0
65	23.0	30.0	27.5	42.0
70	19.0	25.0	23.0	23.0
75	100.0	100.0	100.0	100.0

* For all ages, rates of 32% for 1st year of employment and 23% for 2nd year.
** 94% are presumed to be non-duty related, and 6% are assumed to be duty related.
*** For Tier 4 members, 30 years of service.

SALARY INCREASES: Representative values of the assumed annual rates of salary increases are as follows:

		Annual Rates of	
Service	Merit & Seniority	Base (Economy)	Increase Next Year
0	15.25%	3.75%	19.00%
1	5.25	3.75	9.00
2	2.75	3.75	6.50
3	1.75	3.75	5.50
4	1.25	3.75	5.00
5-7	0.75	3.75	4.50
8-27	0.25	3.75	4.00
28 and Over	0.00	3.75	3.75

PAYROLL GROWTH: 3.75% per annum, compounded annually.

ADMINISTRATIVE EXPENSES: 0.23% of payroll.

TIMING OF DECREMENTS AND PAY INCREASES: Middle of Year.

DEATH AFTER RETIREMENT: The mortality table, for post-retirement mortality, used in evaluating allowances to be paid is the RP-2014 Healthy Annuitant Blue Collar Table projected with Scale BB to 2016 with males rates set forward one year. The RP-2014 Disabled Retiree Table set forward 5 years for males and 4 years for females was used for the period after disability retirement. This assumption is used to measure the probabilities of each benefit payment being made after retirement. Mortality improvement is anticipated under this assumption as recent mortality experience shows actual deaths 9.3% greater than expected under the selected table for non-disability mortality and 6.3% greater than expected under the selected table for disability mortality.

MARRIAGE ASSUMPTION: 85% married with the husband three years older than his wife.

UNUSED SICK LEAVE: 0.50 years at retirement.

MILITARY SERVICE: 0.25 years at retirement.

DEFERRED VESTEDS: 40% of vested participants will forfeit their accrued benefit and receive their employee contributions with interest.

ASSUMED INTEREST RATE ON EMPLOYEE CONTRIBUTIONS: 2.00%.

VALUATION METHOD: The valuation is prepared on the projected benefit basis, which is used to determine the present value of each member's expected benefit payable at retirement, disability or death. The calculations are based on the member's age, years of service, sex, compensation, expected future salary increases, and an assumed future interest earnings rate (currently 7.75%). The calculations consider the probability of a member's death or termination of employment prior to becoming eligible for a benefit and the probability of the member terminating with a service, disability, or survivor's benefit. The present value of the expected benefits payable to active members is added to the present value of the expected future payments to current benefit recipients to obtain the present value of all expected benefits payable to the present group of members and survivors.

The employer contributions required to support the benefits of PERS are determined following a level funding approach, and consist of a normal contribution and an accrued liability contribution.

The normal contribution is determined using the "entry age normal" method. Under this method, a calculation is made for pension benefits to determine the uniform and constant percentage rate of employer contribution which, if applied to the compensation of the average new member during the entire period of his anticipated covered service, would be required in addition to the contributions of the member to meet the cost of all benefits payable on his behalf.

The unfunded actuarial accrued liability is determined by subtracting the current assets and the present value of prospective employer normal contributions and member contributions from the present value of expected benefits to be paid from the PERS. The accrued liability contribution amortizes the balance of the unfunded actuarial accrued liability over a period of years from the valuation date.

ASSET VALUATION METHOD: Actuarial value. The actuarial value of assets recognizes a portion of the difference between the market value of assets and the expected market value of assets, based on the assumed valuation rate of return. The amount recognized each year is 20% of the difference between market value and expected market value.

INTEREST RATE: 7.75% per annum, compounded annually (net of investment expenses only).

SEPARATIONS FROM ACTIVE SERVICE: Representative values of the assumed annual rates of separation from active service are as follows:

Age	Withdrawal and Vesting*	Death Males	Death Females	Disability Non-Duty	Disability Duty	Service	Service Retirement*
25	4.00%	0.03%	0.01%	0.10%	0.01%	5	5%
30	3.50	0.03	0.01	0.12	0.02	10	5%
35	2.50	0.03	0.01	0.16	0.05	15	5%
40	1.00	0.04	0.01	0.20	0.07	20	5%
45	1.00	0.05	0.02	0.30	0.06	25	10%
50	0.50	0.09	0.04	0.50	0.05	30	25%
55	0.00	0.15	0.06	0.91	0.02	35	25%
60	0.00	0.24	0.08	1.55	0.01	40+	100%

* The annual rate of service retirement is 100% at age 61.

It is assumed that a member will be granted 1¾ years of service credit for unused leave at termination of employment. In addition, it is assumed that, on average, ¼ year of service credit for peace-time military service will be granted to each member.

SALARY INCREASES: Representative values of the assumed annual rates of salary increases are as follows:

Age	Merit & Seniority	Base (Economy)	Annual Rates of Increase Next Year
20	5.56%	3.75%	9.31%
25	2.31	3.75	6.06
30	1.49	3.75	5.24
35	1.49	3.75	5.24
40	1.49	3.75	5.24
45	1.00	3.75	4.75
50	0.50	3.75	4.25
55	0.50	3.75	4.25

PAYROLL GROWTH: 3.75% per annum, compounded annually.

PRICE INFLATION: 3.00% per annum, compounded annually.

ADMINISTRATIVE EXPENSES: 0.23% of payroll.

TIMING OF DECREMENT AND PAY INCREASES: Middle of Year.

DEATH AFTER RETIREMENT: The mortality table, for post-retirement mortality, used in evaluating allowances to be paid was the RP-2014 Healthy Annuitant Blue Collar Mortality Table Projected to 2016 by Scale BB (set forward 1 year for males). The RP-2014 Disabled Retiree Mortality Table (set forward 5 years for males and set forward 4 years for females) was used for the period after disability retirement. This assumption is used to measure the probabilities of each benefit payment being made after retirement.

MARRIAGE ASSUMPTION: 100% married with the husband three years older than his wife.

ASSUMED INTEREST RATE ON EMPLOYEE CONTRIBUTIONS: 2.00%.

VALUATION METHOD: The valuation is prepared on the projected benefit basis, which is used to determine the present value of each member's expected benefit payable at retirement, disability or death. The calculations are based on the member's age, years of service, sex, compensation, expected future salary increases, and an assumed future interest earnings rate (currently 7.75%). The calculations consider the probability of a member's death or termination of employment prior to becoming eligible for a benefit and the probability of the member terminating with a service, disability, or survivor's benefit. The present value of the expected benefits payable to active members is added to the present value of the expected future payments to current benefit recipients to obtain the present value of all expected benefits payable to the present group of members and survivors.

The employer contributions required to support the benefits of HSPRS are determined following a level funding approach, and consist of a normal contribution and an accrued liability contribution.

The normal contribution is determined using the "entry age normal" method. Under this method, a calculation is made for pension benefits to determine the uniform and constant percentage rate of employer contribution which, if applied to the compensation of the average new member during the entire period of his anticipated covered service, would be required in addition to the contributions of the member to meet the cost of all benefits payable on his behalf.

The unfunded actuarial accrued liability is determined by subtracting the current assets and the present value of prospective employer normal contributions and member contributions from the present value of expected benefits to be paid from the HSPRS. The accrued liability contribution amortizes the balance of the unfunded actuarial accrued liability over a period of years from the valuation date.

ASSET VALUATION METHOD: Actuarial value. The actuarial value of assets recognizes a portion of the difference between the market value of assets and the expected market value of assets, based on the assumed valuation rate of return. The amount recognized each year is 20% of the difference between market value and expected market value.

MISSISSIPPI HIGHWAY SAFETY PATROL RETIREMENT SYSTEM
History of Benefit Modifications

Fiscal Year Beginning	Benefit Modifications
July 1, 1958	• Mississippi Highway Safety Patrol Retirement System created.
July 1, 1966	• Removed limit of $200 per month for disability retirement payments. • Eliminated reduction in retirement benefits resulting from Social Security payments. • Provided same survivor benefits to disability retirant's beneficiaries as those provided for service retirant's beneficiaries.
July 1, 1974	• Authorized military service credit (not to exceed 4 years maximum unless proof furnished member was retained by causes beyond his control).
July 1, 1975	• Provided additional benefit payments (13th Checks) to retired patrolmen. • Authorized payment of benefits to spouses and families of patrolmen who die after serving minimum period or who are killed in line of duty.
July 1, 1976	• Provided benefits to widows of highway patrolmen who were killed in line of duty prior to enactment of highway patrol retirement system.
July 1, 1977	• Provided that a highway patrolman who reenters service with the highway safety patrol may receive retirement credit for prior years upon repayment of amount refunded and interest from date of refund to repayment.
July 1, 1979	• Provided guaranty of benefits and maximum retirement allowance in the highway safety patrol retirement system.
July 1, 1980	• Provided a minimum service and disability retirement benefit for members of MHSPRS. • Provided any member who served in maritime service during periods of hostility in WWII shall be allowed credit for maritime service. • Provided all members who served in armed forces during war or military conflict or in maritime service during periods of hostility in WWII shall be allowed credit regardless of when they retired.
July 1, 1982	• Provided employer pickup of member contributions. • Increases additional payment (13th check) to 1/2 of annual percentage change of CPI not to exceed 2 1/2%.
July 1, 1984	• Provided that unused leave shall be treated as creditable service under MHSPRS.
July 1, 1985	• Increased 13th check to an amount equal to 2 1/2% of annual percentage change in CPI for years thru 6-30-85; and for subsequent years 100% of annual percentage change in CPI not to exceed 2 1/2%; provided an additional amount could be paid in increments of 1/4 of 1% to a maximum of 1 1/2% provided there were sufficient gains in excess of accrued liability.
July 1, 1986	• Reduced to 5 years the required years to qualify to retire at age 55. • Provided full retirement with 30 years creditable service regardless of age.

Fiscal Year Beginning	Benefit Modifications
	• Reduced the number of years which determine average compensation to 4 highest consecutive years. • 3% reduction in retirement allowance shall apply to the lesser of: each year of age below age 55 or each year less 30 years of creditable service. • Provided retirement allowance shall not exceed 85% of average compensation. • Provided mandatory retirement and termination of membership at age 60. • Provided no monthly benefit payment may be made for a period of time in excess of that allowed by federal law. • Provided an ad hoc increase of 3% to retirees who retired prior to July 1, 1986, and average compensation was based on 5 consecutive years of earned compensation instead of 4. • Provided that a retiree may elect by an irrevocable agreement to receive additional payment (13th check) in equal installments not to exceed 6 months. • Amended section 25-13-13 on death benefits to conform to section 25-13-11 allowing 5 year vesting by deleting 10 year requirement. • Provided a one-time early retirement for any member who had at least 20 years of creditable service; exempted early service retirement allowance from the 3% reduction if member is below age 55; allowance was based on current fiscal year's salary.
July 1, 1989	• Provided survivor benefits from day one of employment to a spouse and/or dependent children of a member who is either killed in the line of performance of duty or dies as a direct result.
July 1, 1990	• Amended section 25-13-11 to reduce from 30 to 25 numbers of years required for full retirement regardless of age. • Provided a 10% ad hoc increase in annual retirement allowance to retired members and beneficiaries with minimum benefits of $500.00 if retired with 15 or more years of service credit; $300.00 per month if retired with 10 or more but less than 15 years credit; $250.00 per month to anyone with less than 10 years credit; beneficiaries to receive a minimum of $250.00 per month. • Established options for service and disability retirees retiring 7-1-90 or later. • Provided an active member qualified for retirement may pre-select an option. • Provided option selection will take precedence over automatic survivor benefits.
July 1, 1991	• Allowed sworn agents of MS Bureau of Narcotics, who were employed by such bureau prior to December 1, 1990, regardless of age, may be employed as enforcement officers, if they meet all other qualifications. Those employed retain all compensatory, personal and sick leave accrued; • Provided cost-of-living payment (13th check) shall be cumulative to conform to PERS law.

Fiscal Year Beginning	Benefit Modifications
	• Provided regular interest shall be credited annually to member's employee contribution account.
July 1, 1992	• Provided benefits to dependent children to age 23 if they remain in school.
July 1, 1997	• Allowed retired Highway Patrolmen to irrevocably elect to have COLA (13th check) paid in twelve (12) equal installments.
July 1, 1999	• Provide that if the member and beneficiary die before having received in benefits an amount equal to the total of the contributions and accrued interest of the member at the time of death, that the balance will be refunded to the designated beneficiary or by statutory succession. • Provided that payment of death benefits shall be in accordance with the statutory provisions set forth as of the date of death of the member. • Authorized a retiree who retired before or after July 1, 1999, to be eligible for the same "pop-up" and "pop-down" provisions of PERS; and recalculates the benefits of those retirees who selected Option 5 "pop-up" protection. • Authorized an ad hoc benefit adjustment to each member of the Mississippi Highway Safety Patrol Retirement System (MHSPRS) retired on or before July 1, 1999, in the amount of $3.50 per month for each full fiscal year of retirement through June 30, 1999, plus $1.00 per month for each year of service credit used in the calculation of benefits. • Removed from consideration in the base COLA the requirement that the Consumer Price Index (CPI) have increased by at least 2 ½%. • Provided that a prorated portion of the annual adjustment will be paid to the beneficiary or estate of any member or beneficiary who is receiving the annual adjustment in a lump sum, but who dies between July 1 and December 1 in those cases where no more monthly benefits will be paid after the member's or beneficiary's death. This prorated portion will be equal to the amount that such recipient would have received had he or she elected to receive the annual adjustment for the year on a monthly basis.
July 1, 2000	• Deleted the maximum option where no additional benefits are payable after death. The statute retains Option 9, which provides a maximum option with a 50% survivor benefit with no reduction in the member's retirement allowance. • Provided for a new retirement option that would allow a member who is eligible for an unreduced retirement benefit to select a partial lump-sum option at retirement. • **Allowed the Cost of Living Adjustment to be calculated on all full fiscal years in retirement, not just the years since the retirant's last retirement.** • Provided for the same service credit for active duty, as is allowed in PERS and is no longer limited to active duty service during times of conflict. This amendment applies to all persons who have retired from the Highway Patrol

Fiscal Year Beginning	Benefit Modifications
	and who qualify for such credit, whether they retired before or after July 1, 2000. This provision, however, did not require any back payments. • Changed the maximum limitation on the retirement benefit from 85% of the average compensation regardless of the years of service to 100% of the average compensation.
July 1, 2002	• Provided that Option 4-C, Social Security Leveling Option, will no longer be available to members retiring on or after July 1, 2004. • Provided that any member who has five years of service (reduced from 10 years) may apply for a regular non-duty related disability retirement allowance. • Provided for a compounded COLA, based on 3% of the retirement allowance for each full fiscal year in retirement with the 3% compounding beginning at age 60; to further provide that the age at which the compounding begins will be reduced gradually to age 55 as such can be accomplished without causing the unfunded accrued liability amortization period to exceed 20 years; to further provide that a pro-rated share of the lump-sum COLA will be paid if a benefit terminates before December 1 of the fiscal year. Also, allows the Board to grant a change in the manner the COLA is paid if a hardship is shown.
July 1, 2004	• Conformed the MHSPRS COLA section (except for the age of compounding) to the provisions in PERS. • Eliminated the re-marriage penalty which terminates a spouse's benefit, currently provided in subsections (1) and (3), upon his/her remarriage. This amendment also allows those spouses whose benefits have been previously terminated to apply to have the benefits reinstated prospectively.
July 1, 2008	• Allowed a retroactive effective date (up to 3 months) for retirees who revert from Option 2 or Option 4A to the maximum option following the death of the named beneficiary.
July 1, 2011	• Option 4, a 75% joint and survivor annuity, made available to members who retire on or after July 1, 2011 • For members hired on or after July 1, 2011, the mandatory retirement age was increased from age 60 to age 63.
July 1, 2016	• The interest rate on employee contributions shall be calculated based on the money market rate as published by the Wall Street Journal on December 31 of each preceding year with a minimum rate of one percent and a maximum rate of five percent. • The early retirement formula shall be reduced by an actuarially determined percentage or factor (rather than a fixed 3%) for each year of age below 55 or for each year of service below 25, whichever is less.

INTEREST RATE: 7.75% per annum, compounded annually (net of investment expenses only).

SEPARATIONS FROM ACTIVE SERVICE: Representative values of the assumed rates of separation from active service are as follows:

	Annual Rate of		
	Death		
Age	Male	Female	Disability*
20	0.02%	0.01%	0.04%
25	0.03	0.01	0.05
30	0.03	0.01	0.07
35	0.03	0.01	0.11
40	0.04	0.01	0.17
45	0.05	0.02	0.23
50	0.09	0.04	0.30
55	0.15	0.06	0.35
60	0.24	0.08	0.40
65	0.41	0.12	0.00
70	0.69	0.20	0.00
75	1.12	0.34	0.00

* 94% are presumed to be non-duty related, and 6% are assumed to be duty related.

WITHDRAWAL AND VESTING: 20% in an election year, none in a non-election year.

SERVICE RETIREMENT: 25% in an election year, none in a non-election year. All members are assumed to retire no later than age 80.

UNUSED LEAVE: It is assumed that a member will be granted 2.5 years of service credit for unused leave at termination of employment.

PRICE INFLATION: 3.00% per annum, compounded annually.

PAYROLL GROWTH: 3.75% per annum, compounded annually.

ADMINISTRATIVE EXPENSES: 0.23% of payroll.

TIMING OF DECREMENTS AND PAY INCREASES: Middle of Year.

SALARY INCREASES: 3.75% per annum, for all ages.

DEATH AFTER RETIREMENT: The mortality table, for post-retirement mortality, used in evaluating allowances to be paid was the RP-2014 Healthy Annuitant Blue Collar Mortality Table Projected to 2016 by Scale BB (set forward 1 year for males). The RP-2014 Disabled Mortality Table (set forward 5 years for males and set forward 4 years for females) was used for the period after disability retirement. This assumption is used to measure the probabilities of each benefit payment being made after retirement.

MARRIAGE ASSUMPTION: 85% married with the husband three years older than his wife.

ASSUMED INTEREST RATE ON EMPLOYEE CONTRIBUTIONS: 2.00%.

VALUATION METHOD: The valuation is prepared on the projected benefit basis, which is used to determine the present value of each member's expected benefit payable at retirement, disability or death. The calculations are based on the member's age, years of service, sex, compensation, expected future salary increases, and an assumed future interest earnings rate (currently 7.75%). The calculations consider the probability of a member's death or termination of employment prior to becoming eligible for a benefit and the probability of the member terminating with a service, disability, or survivor's benefit. The present value of the expected benefits payable to active members is added to the present value of the expected future payments to current benefit recipients to obtain the present value of all expected benefits payable to the present group of members and survivors.

The employer contributions required to support the benefits of SLRP are determined following a level funding approach, and consist of a normal contribution and an accrued liability contribution.

The normal contribution is determined using the "entry age normal" method. Under this method, a calculation is made for pension benefits to determine the uniform and constant percentage rate of employer contribution which, if applied to the compensation of the average new member during the entire period of his anticipated covered service, would be required in addition to the contributions of the member to meet the cost of all benefits payable on his behalf.

Appendix D – SLRP Actuarial Assumptions and Methods

The unfunded actuarial accrued liability is determined by subtracting the current assets and the present value of prospective employer normal contributions and member contributions from the present value of expected benefits to be paid from the SLRP. The accrued liability contribution amortizes the balance of the unfunded actuarial accrued liability over a period of years from the valuation date.

ASSET VALUATION METHOD: Actuarial value. The actuarial value of assets recognizes a portion of the difference between the market value of assets and the expected market value of assets, based on the assumed valuation rate of return. The amount recognized each year is 20% of the difference between market value and expected market value.

Funding Policy for PERS and SLRP

The purpose of the funding policy is to state the overall funding goals for the Public Employees' Retirement System of Mississippi and the Supplemental Legislative Retirement Plan (jointly referred to as "System" in this policy), the benchmarks that will be used to measure progress in achieving those goals, and the methods and assumptions that will be employed to develop the benchmarks.

The policy refers to pension benefits and does not address retiree healthcare benefits that may be provided under statute in the future. In addition to periodic reviews of this policy, the Board will amend the policy if retiree healthcare benefits become payable.

I. Funding Goals

The objective in requiring employer and member contributions to the System is to accumulate sufficient assets during a member's employment to fully finance the benefits the member receives throughout retirement. In meeting this objective, the System will strive to meet the following funding goals:

- To maintain an increasing ratio of system assets to accrued liabilities and reach an 80 percent minimum funded ratio in 2042;
- To maintain adequate asset levels to finance the benefits promised to members;
- To develop a pattern of stable contribution rates when expressed as a percentage of member payroll as measured by valuations prepared in accordance with the principles of practice prescribed by the Actuarial Standards Board, with a minimum employer contribution equal to the normal cost determined under the Entry Age Normal funding method;
- To provide intergenerational equity for taxpayers with respect to System costs; and
- To fund benefit improvements through increases in contribution rates in accordance with Article 14, § 272A, of the Mississippi Constitution.

II. Benchmarks

To track progress in achieving the previously outlined funding goals, the following benchmarks will be measured annually as of the actuarial valuation date (with due recognition that a single year's results may not be indicative of long-term trends):

- **Funded ratio -** The funded ratio, defined as the actuarial value of System assets divided by the System's actuarial accrued liability, should be increasing over time, before adjustments for changes in benefits, actuarial methods, and/or actuarial assumptions, with a target of at least 80 percent in 2042. If the projected funded ratio is less than 60 percent in 2042 or if the projected funded ratio is projected to be less than 75 percent in 2042 following two consecutive annual projection reports, a contribution rate increase will be determined that is sufficient to generate a funded ratio of 85 percent in 2042. If a funded ratio of 100 percent or more is attained, and is projected to remain above 100 percent for the ensuing 30 years following two consecutive annual projection reports, a reduced contribution pattern will be established provided the projected funded ratio remains at or above 100 percent in every future year.

- **Contribution rate history -** Employer and member contribution rates should be level from year to year when expressed as a percent of active member payroll unless the projected funded ratio reaches a level that triggers a change in contribution rates. The initial employer contribution rates for the Public Employees' Retirement System of Mississippi (PERS) and the Supplemental Legislative Retirement Plan (SLRP) set under this policy as revised October 23, 2012, will be 15.75 percent and 7.40 percent, respectively, of active member payroll effective July 1, 2013.
- **Unfunded Actuarial Accrued Liability (UAAL) amortization period -** The amortization period for the System's UAAL should be declining over time.

III. Methods and Assumptions

The actuarial funding method used to develop the benchmarks will be entry age normal. The method used to develop the actuarial value of assets will recognize the underlying market value of the assets by spreading each year's unanticipated investment income (gains and losses) over a five-year smoothing period (20 percent per year) as adopted by the Board.

The actuarial assumptions used will be those last adopted by the Board based upon the advice and recommendation of the System's actuary. The actuary shall conduct an investigation into the system's experience at least every two years on a rolling four year basis, and utilize the results of the investigation to form the basis for those recommendations.

The Board will have an audit of the System's actuarial valuation results conducted by an independent actuary at least every six years. The purpose of such a review is to provide a critique of the reasonableness of the actuarial methods and assumptions in use and the resulting actuarially computed liabilities and contribution rates.

IV. Funding Policy Review

The funding policy components and triggers will be reviewed annually following the annual actuarial valuation and in conjunction with the annual projection report and will be amended as necessary following each experience investigation conducted by the Board.

Appendix E – Board Funding Policies

Funding Policy for HSPRS

The purpose of the funding policy is to state the overall funding goals for the Mississippi Highway Safety Patrol Retirement System (System), the benchmarks that will be used to measure progress in achieving those goals, and the methods and assumptions that will be employed to develop the benchmarks.

I. Funding Goals

The objective in requiring employer and member contributions is to accumulate sufficient assets during a member's employment to fully finance the benefits the member receives throughout retirement. In meeting this objective, the System will strive to meet the following funding goals:

- To maintain an increasing ratio of System assets to accrued liabilities and reach an 80 percent minimum funded ratio in 2042;
- To maintain adequate asset levels to finance the benefits promised to members;
- To develop a pattern of stable contribution rates when expressed as a percentage of member payroll as measured by valuations prepared in accordance with the principles of practice prescribed by the Actuarial Standards Board, with a minimum employer contribution equal to the normal cost determined under the Entry Age Normal funding method;
- To provide intergenerational equity for taxpayers with respect to system costs; and
- To fund benefit improvements through increases in contribution rates in accordance with Article 14, § 272A, of the Mississippi Constitution.

II. Benchmarks

To track progress in achieving the previously outlined funding goals, the following benchmarks will be measured annually as of the actuarial valuation date (with due recognition that a single year's results may not be indicative of long-term trends):

- **Funded ratio -** The funded ratio, defined as the actuarial value of System assets divided by the System's actuarial accrued liability, should be increasing over time before adjustments for changes in benefits, actuarial methods, and/or actuarial assumptions, with a target of at least 80 percent in 2042. If the funded ratio is projected to be less than 60 percent in 2042 or if the funded ratio is projected to be less than 70 percent following three consecutive annual projection reports, a contribution rate increase will be determined that is sufficient to generate a funded ratio of 90 percent in 2042. If a funded ratio of 100 percent or more is attained, and is projected to remain above 100 percent for the ensuing 30 years following three consecutive annual projection reports, a reduced contribution pattern will be established provided the projected funded ratio remains at or above 100 percent in every future year.

- **Contribution rate history -** Employer and member contribution rates should be level from year to year when expressed as a percent of active member payroll unless the projected funded reaches a level that triggers a change in contribution rates. The initial employer contribution rate set under this policy as revised June 19, 2013 is 37.00 percent of active member payroll effective July 1, 2013.
- **Unfunded Actuarial Accrued Liability (UAAL) amortization period -** The amortization period for the System's UAAL should be declining over time.

III. Methods and Assumptions

The actuarial funding method used to develop the benchmarks will be entry age normal. The method used to develop the actuarial value of assets will recognize the underlying market value of the assets by spreading each year's unanticipated investment income (gains and losses) over a five-year smoothing period (20 percent per year), as adopted by the Board of Trustees of the Public Employees' Retirement System of Mississippi (PERS). The actuarial assumptions used will be those last adopted by the PERS Board based upon the advice and recommendation of the System's actuary. The actuary shall conduct an investigation into the System's experience at least every two years on a rolling four-year basis, and utilize the results of the investigation to form the basis for those recommendations.

The PERS Board will have an audit of the System's actuarial valuation results conducted by an independent actuary at least every six years. The purpose of such a review is to provide a critique of the reasonableness of the actuarial methods and assumptions in use and the resulting actuarially computed liabilities and contribution rates.

IV. Funding Policy Review

The funding policy components and triggers will be reviewed annually following the annual actuarial valuation and in conjunction with the annual projection report and will be amended as necessary following each experience investigation conducted by the Board.