Gabriel Roeder Smith & Company
Consultants & Actuaries

OHIO STATE HIGHWAY PATROL RETIREMENT SYSTEM

5-YEAR ACTUARIAL INVESTIGATION OF THE DROP

JANUARY 1, 2010 THROUGH DECEMBER 31, 2014

5 – YEAR ACTUARIAL INVESTIGATION OF THE DROP
JANUARY 1, 2010 – DECEMBER 31, 2014

TABLE OF CONTENTS

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March 3, 2016

The Retirement Board
Ohio State Highway Patrol Retirement System
Columbus, Ohio

Dear Board Members:

Presented in this report are the results of an ***actuarial investigation of experience*** of the Deferred Retirement Option Program (DROP) of the Ohio State Highway Patrol Retirement System. The investigation was conducted for the purpose of determining whether the DROP, as established or modified, has had a negative financial impact on the retirement system and, if so, to make recommendations as to how to modify the plan for future DROP members. This report should not be relied upon for any other purpose.

The investigation covers the period ***January 1, 2010 to December 31, 2014.*** It is based upon information furnished by the Retirement System Staff, concerning Retirement System benefits, financial transactions, plan provisions and active members, terminated members, retirees and beneficiaries. We checked for internal and year-to-year consistency, but did not otherwise audit the information. We are not responsible for the accuracy or completeness of such information.

The investigation was carried out using generally accepted actuarial principles and techniques in accordance with standards of practice prescribed by the Actuarial Standards Board. Future investigation results may differ significantly from the current results presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law.

Brian B. Murphy and Mita D. Drazilov are Members of the American Academy of Actuaries (MAAA) and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

Respectfully submitted,

Brian B. Murphy

Brian B. Murphy, FSA, EA, MAAA

Mita Drazilov

Mita D. Drazilov, ASA, MAAA

BBM:MDD:bd

SECTION A

INTRODUCTION

5 – YEAR ACTUARIAL INVESTIGATION OF THE DROP
INTRODUCTION

Section 5505.12 of the Revised Code of Ohio reads in part as follows:

"At least once in each five-year period, the board shall have prepared by or under the supervision of an actuary an actuarial investigation of the deferred retirement option plan established under section 5505.50 of the Revised Code. The investigation shall include an examination of the financial impact, if any, on the retirement system of offering the plan to members.

The actuary shall prepare a report of the actuarial investigation. The report shall include a determination of whether the plan, as established or modified, has a negative financial impact on the retirement system and, if so, recommendations on how to modify the plan to eliminate the negative financial impact. If the actuarial report indicates that the plan has a negative financial impact on the retirement system, the board shall modify the plan. If the board modifies the plan, the rights and obligations of members who have already elected to participate shall not be altered."

The phrase "negative financial impact on the retirement system" is open to more than one interpretation. For purposes of this investigation, we have interpreted "negative financial impact on the retirement system" to mean that the long-term cost of the Ohio State Highway Patrol Retirement System (HPRS) would be materially less if the DROP were removed. In other words, we would say that a negative financial impact on the retirement system had occurred if the addition of the DROP was found to have added materially to the long-term cost of HPRS. We believe this is a reasonable interpretation since the DROP is a benefit program affecting the active members of the retirement system up to the point of retirement. Given that other interpretations exist, the Board may wish to review our interpretation with Legal Counsel.

For purposes of determining whether the DROP has a "negative financial impact on the retirement system," we have performed the following analysis:

(1) Reviewed the actual retirement experience of active members over the period January 1, 2010 through December 31, 2014 to determine what extent members have been delaying retirement.
(2) Reviewed the actual experience of DROP participation over the period January 1, 2010 through December 31, 2014 to determine what extent members have been participating in the DROP program.
(3) Reviewed the results of the actuarial analysis of House Bill 202 which measured the financial effect of removing the DROP program for future members.

SECTION B

SUMMARY OF DEFERRED RETIREMENT OPTION PROGRAM

SUMMARY OF DEFERRED RETIREMENT OPTION PROGRAM

The Deferred Retirement Option Program was established in June 2006. Members are eligible for a one-time election to "DROP in" upon attainment of unreduced retirement eligibility. The primary features of the DROP include:

a) During participation in the DROP, members continue to make contributions based upon the member contribution rate. While participating in the DROP, 100% of members' contributions, up to 10% of payroll, are deposited to their DROP account.

b) 100% of the member's computed benefit (based upon service and salary at time of DROP), including any scheduled post-retirement increases is credited to the member's DROP account.

c) The DROP account is credited with interest annually based upon a rate of return earned on a selected group of fixed income type investments (assumed to be 8% for actuarial valuation purposes).

d) A member who "DROPs in" must stay in the DROP for a minimum period of time based on age at time of "DROPing in". A minimum participation period of 3 years for members who "DROP in" prior to age 52 and 2 years for members who "DROP in" on or after age 52. After a maximum of 8 years in the DROP program or attaining age 60, the member who entered the DROP program must retire.

e) If the member "DROPs in", the member's annual benefit when the member "DROPs out" (i.e., retires) is based upon the benefit calculations at time of the "DROP in", including any post-retirement increases that may have accrued during the DROP participation period.

f) If, during participation in the DROP, a member becomes disabled due to a duty related injury/illness, the member can choose to 1) have a disability pension benefit calculated based on the assumption that participation in the DROP did not occur, or 2) the member can elect to accept the age/service pension benefit achieved through DROP participation plus the accumulation in the DROP account. Duty disability benefit recipients will not suffer the loss of accumulated interest for early departure from the DROP.

g) Once a member elects to participate in the DROP, their contributions are committed for the minimum period (2 or 3 years). If the member voluntarily discontinues DROP participation prior to the minimum participation period, the member will not receive any interest accumulated in the DROP account but will receive all accumulated pension benefits and pension contributions deposited into the DROP account at the end of the minimum participation period.

SECTION C

ANALYSIS OF EXPERIENCE

ANALYSIS OF EXPERIENCE

To the extent that members participate in the DROP program, one of the key determinants to whether there is "negative financial impact on the retirement system" is the extent in which members delay their retirement. Presented below is a comment that was included in the actuarial analysis of the DROP program when it was being considered for adoption (please see Appendix B for the full supplemental valuation report dated February 8, 2005):

(1) *The rates of retirement assumed in connection with this study were developed following consultation with the Board. As illustrated on the previous page, the rates imply that on average, the DROP will induce people to work 1.3 years longer than they otherwise would have worked. This is an absolutely critical assumption. If this assumption is not met, the plan will not be cost neutral, unless other sources of savings materialize. After 5 years of experience are available under the DROP, an experience study can be performed, that will give some indication of the effect of the DROP on retirements. The full effects may not be fully measurable until 10 years have elapsed.*

(2) *If, due to the proposed DROP, members in fact retire later than at present, some potential savings may result in the retiree health plan. The results presented on page 3 do not include a measurement of these potential savings. Such savings cannot be estimated reliably, since the HPRS retiree health plan is largely a secondary payer for many younger retirees.*

As part of the 5-year Experience Study of actuarial assumptions covering the period January 1, 2010 through December 31, 2014, retirement experience over the period was analyzed. The Experience Study indicated that members were retiring generally in accordance with the retirement rates that were used to recognize the DROP program.

In addition, an analysis was performed on the members who were eligible to participate in the DROP over the period January 1, 2006 through December 31, 2014. (Please see pages C-2 and C-3.) It can be seen that the DROP program is being utilized quite extensively. If the member chooses to enter the DROP program (roughly 80% of those eligible to DROP from 2010 through 2013 did so), most do so in the first year of eligibility.

RETIREMENT AND DROP EXPERIENCE
JANUARY 1, 2010 THROUGH DECEMBER 31, 2014

	2014		2013		2012		2011		2010	
Active Members First Eligible for Unreduced Retirement/DROP	37		38		36		42		27	
Members Who Did Not DROP or Retire	9	24.3%	9	23.7%	4	11.1%	11	26.2%	9	33.3%
DROPed*	21	56.8%	25	65.8%	26	72.2%	24	57.1%	14	51.9%
Retired	7	18.9%	4	10.5%	6	16.7%	7	16.7%	4	14.8%
		100.0%		100.0%		100.0%		100.0%		100.0%
What Happened to Members Who Did Not DROP or Retire when First Eligible??	9	Continuing Active in 2014	9	Continuing Active in 2013	4	Continuing Active in 2012	11	Continuing Active in 2011	9	Continuing Active in 2010
Retired in 2014	0		1		0		1		2	
Retired in 2013			0		0		1		1	
Retired in 2012					0		1		1	
Retired in 2011							0		0	
Retired in 2010									0	
Remain in Employment as of December 31, 2014	9		8		4		8		5	
DROPed After 1st Year of Eligibility	0		5		3		9		9	
What Happened to DROP Members??	21	DROPed in 2014	25	DROPed in 2013	26	DROPed in 2012	24	DROPed in 2011	14	DROPed in 2010
Retired in 2014	0		3		3		2		2	
Retired in 2013			0		2		4		2	
Retired in 2012					1		6		2	
Retired in 2011							0		1	
Retired in 2010									3	
Remain in Employment as of December 31, 2014	21		22		20		12		4	

** Includes members who DROPed and retired in the same year.*

RETIREMENT AND DROP EXPERIENCE
JANUARY 1, 2010 THROUGH DECEMBER 31, 2014

	2009		2008		2007		2006**	
Active Members First Eligible for Unreduced Retirement/DROP	42		48		31		120	
Members Who Did Not DROP or Retire	12	28.6%	10	20.8%	14	45.2%	34	28.3%
DROPed*	26	61.9%	28	58.4%	10	32.2%	60	50.0%
Retired	4	9.5%	10	20.8%	7	22.6%	26	21.7%
		100.0%		100.0%		100.0%		100.0%
What Happened to Members Who Did Not DROP or Retire when First Eligible??	12	Continuing Active in 2009	10	Continuing Active in 2008	14	Continuing Active in 2007	34	Continuing Active in 2006
Retired in 2014	2		1		3		3	
Retired in 2013	2		1		0		3	
Retired in 2012	1		1		1		2	
Retired in 2011	2		2		3		3	
Retired in 2010	3		1		1		3	
Retired in 2009	0		2		1		1	
Retired in 2008			0		1		5	
Retired in 2007					0		7	
Remain in Employment as of December 31, 2014	2		2		4		7	
DROPed After 1st Year of Eligibility	7		5		6		15	
What Happened to DROP Members??	26	DROPed in 2009	28	DROPed in 2008	10	DROPed in 2007	60	DROPed in 2006
Retired in 2014	2		1		1		6	
Retired in 2013	2		3		0		7	
Retired in 2012	6		2		1		4	
Retired in 2011	5		6		5		13	
Retired in 2010	3		7		2		12	
Retired in 2009	0		2		0		12	
Retired in 2008			5		1		4	
Retired in 2007					0		2	
Remain in Employment as of December 31, 2014	8		2		0		0	

* *Includes members who DROPed and retired in the same year.*

** *2006 was the first year of the DROP program. The totals include all members eligible for normal retirement, regardless of whether or not it was their first eligibility.*

SECTION D

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS AND RECOMMENDATIONS

The regular 5-year Experience Study of actuarial assumptions covering the period January 1, 2010 through December 31, 2014 indicated that members were retiring generally in accordance with the retirement rates that were used to recognize the DROP program. Additional information presented in this report, and in particular the information provided on pages C-2 and C-3, supports that assertion.

In June of 2011, GRS evaluated House Bill No. 202 which provided in part, that no one would be permitted to enter the DROP from and after the enactment of the legislation provided in House Bill No. 202 (please see Appendix A). In order to evaluate House Bill No. 202, we assumed that in the long term, retirement rates would return to the level that they had been prior to creation of the DROP. Under those circumstances, we found that the long term cost of HPRS would actually go up, which would indicate that the DROP may be having a small *positive* financial impact on HPRS.

In addition, when adoption of the DROP was being considered, one of the key considerations of whether the DROP would be "cost-neutral" was whether members would delay their retirement with the introduction of the DROP. For the DROP supplemental performed in 2005 (please see Appendix B), it was assumed that the average age at retirement would increase by 1.3 years. We cannot know for certain why people are retiring later than they did prior to implementation of the DROP, but all of the evidence that we see to date indicates that they are, in fact, doing so. For example, the average age at retirement was 51.3 during the 5-year period 2000 through 2004. This was the last 5-year Experience Study period during which the DROP did not exist. The average age at retirement was 52.9 during the 5-year period 2010 through 2014. This is the first full 5-year Experience Study period during which the DROP did exist. Therefore, the actual increase in the average age at retirement is 1.6 years (i.e., 52.9 – 51.3).

We therefore find no evidence that indicates that the DROP has had a "negative financial impact on the retirement system" from inception to December 31, 2014, as we have defined the term. As time passes such measurements will become increasingly difficult, since we can never know with certainty what people would have done if there had never been a DROP.

We recommend continued monitoring of the DROP plan and a repeat of this study in the future in accordance with Statutes.

APPENDIX A

HOUSE BILL NO. 202

GRS
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June 13, 2011

Mr. Dan Weiss
Executive Director
Ohio State Highway Patrol
6161 Busch Blvd. - Suite 119
Columbus, Ohio 43229

Re: House Bill No. 202 As Introduced

Dear Dan:

As requested, we have performed an actuarial analysis of House Bill No. 202, as introduced. Enclosed is our actuarial analysis.

Please note that the enclosed results reflect the actuarial assumptions adopted by the Board of Trustees as a result of the recently completed 5-year Experience Study.

Please feel free to contact us with any questions or comments.

Sincerely,

Mita Drazilov

Mita D. Drazilov

MDD:mdd
Enclosures

cc: Brian Murphy (GRS)
Daina Sofinski (GRS)

Ohio State Highway Patrol Retirement System
House Bill No. 202, As Introduced
Supplemental Actuarial Valuation – December 31, 2009

Submitted To: Mr. Dan Weiss, Executive Director
Ohio State Highway Patrol Retirement System

Submitted By: Brian B. Murphy, FSA, MAAA and Mita D. Drazilov, ASA, MAAA
Gabriel, Roeder, Smith & Company

Date: June 13, 2011

This report presents results of an actuarial valuation of proposed benefit changes for members of the Ohio State Highway Patrol Retirement System (HPRS). The actuaries issuing this report are Members of the American Academy of Actuaries (MAAA) and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

The date of the valuation was December 31, 2009. This means that the results of the supplemental valuation indicate what the December 31, 2009 valuation would have shown if the proposed changes had been in effect on that date. This supplemental valuation does not predict the result of the December 31, 2010 valuation or of any other future actuarial valuation. (Future activities can affect future valuation results in an unpredictable manner.) Rather, the supplemental valuation gives an indication of the probable effect of **only the proposed changes** on future valuations without comment on the complete end result of the future valuations.

Actuarial assumptions and methods were consistent with those adopted by the Board of Trustees as a result of the recently completed 5-year Experience Study, unless otherwise indicated. In particular, the entry age normal actuarial cost method was utilized, the assumed rate of investment return was 8.0% and the assumed rate of active member payroll growth was 4.0%.

This report is intended to describe the financial effect of the proposed plan changes. No statement in this report is intended to be interpreted as a recommendation in favor of the changes, or in opposition to them.

The calculations are based upon assumptions regarding future events, which may or may not materialize. They are also based upon present and proposed plan provisions that are outlined in the report. If you have reason to believe that the assumptions that were used are unreasonable, that the plan provisions are incorrectly described, that important plan provisions relevant to this proposal are not described, or that conditions have changed since the calculations were made, you should contact the authors of this report prior to relying on information in the report.

If you have reason to believe that the information provided in this report is inaccurate, or is in any way incomplete, or if you need further information in order to make an informed decision on the subject matter of this report, please contact the authors of the report prior to making such decision.

Ohio State Highway Patrol Retirement System
House Bill No. 202, As Introduced
Supplemental Actuarial Valuation – December 31, 2009

A brief summary of the active member data used in this valuation is shown below:

		Averages		
Number	**Annual Payroll**	**Pay**	**Age**	**Service**
1,547	$94,824,789	$61,296	38.8 yrs	14.0 yrs

A brief summary of the retiree and deferred data used in this valuation is shown below:

			Averages	
	Number	**Annual Benefits**	**Age**	**Benefit**
Retirees and Beneficiaries	1,385	$45,516,648	64.4 years	$32,864
Deferreds	3	$65,520	51.4 years	$21,840

The **total employer contribution rate** for the two-year period beginning July 1, 2011 is 26.50%, as established by the Board and Statute based upon the results of the December 31, 2009 actuarial valuation. Based upon the preliminary December 31, 2009 actuarial valuation results, the Board at its August, 2010 meeting voted to allocate 23% of payroll to the pension program (for the prior valuation the employer rate for pensions was 22%). The breakdown between employer, employee, pension and health is shown below.

	Employer Contribution Rates Expressed As % of Active Payroll		
	Retirement, Survivor & Disability Allowances	**Post Retirement Health Care**	**Totals**
Employer	23.00%	3.50%	26.50%
Employee	10.00%	0.00 %	10.00%
Totals	33.00%	3.50%	36.50%

Based upon the above rate allocation, the unfunded actuarial accrued liabilities of both the pension program and the retiree health program cannot be amortized as of December 31, 2009.

Ohio State Highway Patrol Retirement System
House Bill No. 202, As Introduced
Supplemental Actuarial Valuation – December 31, 2009
Deferred Retirement Option Program (DROP)

Present Provisions:

Deferred Retirement Option Program (DROP): Members are eligible for a one-time election to "DROP in" upon attainment of unreduced retirement eligibility. The primary features of the DROP include:

a) During participation in the DROP, members continue to make contributions based upon the 10% member contribution rate. While participating in the DROP, 100% of members' contributions are deposited to their DROP account.

b) 100% of the member's computed benefit (based upon service and salary at time of DROP), including any scheduled 3% post-retirement increases, is credited to the member's DROP account.

c) The DROP account is credited with interest annually based upon a rate of return earned on a selected group of cash equivalent type investments (assumed to be 3% for actuarial valuation purposes).

d) A member who "DROPs in" must stay in the DROP for a minimum period of time based on age at time of "DROPing in". A minimum participation period of 3 years for members who "DROP in" prior to age 52 and 2 years for members who "DROP in" on or after age 52. After a maximum of 8 years in the DROP program or attaining age 60, the member who entered the DROP program must retire.

e) If the member "DROPs in", the member's annual benefit when the member "DROPs out" (i.e., retires) is based upon the benefit calculations at time of the "DROP in", including any post-retirement increases that may have accrued during the DROP participation period.

f) If, during participation in the DROP, a member becomes disabled due to a duty related injury/illness, the member can choose to 1) have a disability pension benefit calculated based on the assumption that participation in the DROP did not occur, or 2) the member can elect to accept the age/service pension benefit achieved through DROP participation plus the accumulation in the DROP account. Duty disability benefit recipients will not suffer the loss of accumulated interest for early departure from the DROP.

g) Once a member elects to participate in the DROP, their contributions are committed for the minimum period (2 or 3 years). If the member voluntarily discontinues DROP participation prior to the minimum participation period, the member will not receive any interest accumulated in the DROP account but will receive all accumulated pension benefits and pension contributions deposited into the DROP account at the end of the minimum participation period.

Ohio State Highway Patrol Retirement System
House Bill No. 202, As Introduced
Supplemental Actuarial Valuation – December 31, 2009
Deferred Retirement Option Program (DROP)

Proposed Provisions:

Deferred Retirement Option Program (DROP): No election to participate in the DROP may be made after the effective date of House Bill No. 202.

Actuarial Analysis: The following illustrates (a) the computed change in the employer contribution rate that would result from the proposed change on a level cost basis as a % of active member payroll if increases in the unfunded actuarial accrued liabilities are amortized over a 30-year period and (b) the computed amortization period if employer contribution rates remain unchanged:

a) The computed change in the employer contribution rate if amortized over a 30-year period:

Increase/(Decrease) in	
Total Normal Cost	0.03%
Employee Contribution Rate	0.00%
Employer Normal Cost	0.03%
UAAL % (30-year amortization)	0.07%
Total Employer Contribution - Rate	0.10%
Total Employer Contribution - $ (CY 2010)	$ 98,618

Increase/(Decrease) in	
Actuarial Accrued Liabilities	
Actives	$ 1,179,208
Inactives (Deferreds)	0
Retirees and Beneficiaries	0
Total	$ 1,179,208
Assets	0
UAAL	$ 1,179,208

(b) The computed amortization period if employer contribution rates remain unchanged:

Computed Amortization Period N/A

Ohio State Highway Patrol Retirement System
House Bill No. 202, As Introduced
Supplemental Actuarial Valuation – December 31, 2009
Comments

(1) Based upon the current employer and member contribution rates, and the allocation of contribution rates between the pension program and the retiree health program, the unfunded actuarial accrued liabilities (UAAL) of the pension program as of December 31, 2009 cannot be amortized over a finite period.

(2) If the employer contribution rate was sufficient to produce a 30-year amortization period as of the December 31, 2009 actuarial valuation date, the proposed provisions would increase the computed amortization period by approximately 0.3 years.

(3) The probabilities of retirement used to evaluate the proposal are presented below:

Probabilities of Age and Service Retirement		
Retirement Ages	**With DROP**	**Without DROP**
48	35%	40%
49	15%	35%
50	10%	25%
51	10%	30%
52	15%	30%
53	10%	30%
54	10%	40%
55	20%	25%
56	30%	25%
57	25%	25%
58	20%	30%
59	20%	35%
60 & Over	100%	100%

In addition, it was assumed that 100% of eligible members age 55 and older would retire upon attaining 34 years of service. A member was assumed eligible for unreduced retirement at age 48 or greater with 25 or more years of service or age 52 or greater with 20 or more years of service. A member was assumed eligible for reduced retirement at age 48 or greater with 20 or more years of service.

It was assumed that members eligible to DROP would either retire or "DROP in" at first eligibility for unreduced retirement. 100% of members still working 8 years after first reaching retirement eligibility are assumed to retire.

Ohio State Highway Patrol Retirement System
House Bill No. 202, As Introduced
Supplemental Actuarial Valuation – December 31, 2009
Comments (Concluded)

(4) The following table shows the expected average retirement age, with and without the DROP program:

	With DROP	Without DROP
Expected Average Retirement Age in Years	53.80	52.17

(5) If, due to the proposed removal of the DROP, members in fact retire earlier than at present, some potential costs may result to the retiree health plan. The results presented on page 4 do not include a measurement of these potential costs. Such costs cannot be estimated reliably, since the HPRS retiree health plan is largely a secondary payer for many younger retirees.

(6) Please note that the results of different supplemental valuations are generally not additive. If additional benefit changes are being considered, we would recommend a re-evaluation of the combined provisions.

APPENDIX B

DROP SUPPLEMENTAL

Ohio State Highway Patrol Retirement System
Supplemental Actuarial Valuation
December 31, 2003

Requested By: Mr. Richard Curtis, Executive Director
Ohio State Highway Patrol Retirement System

Submitted By: Brian B. Murphy, F.S.A. and Mita D. Drazilov, A.S.A.
Gabriel, Roeder, Smith & Company

Date: February 8, 2005

This report contains a valuation of a Deferred Retirement Option Program (DROP) for current and future active members of the Ohio State Highway Patrol Retirement System..

The date of the valuation was December 31, 2003. This means that the results of the supplemental valuation indicate what the December 31, 2003 valuation would have shown if the proposed benefit changes had been in effect on that date. **(Results have been shown incorporating the age 60 maximum retirement age benefit provision effective September 16, 2004. It also includes an employer contribution rate of 22.0% to the pension program.)** This supplemental valuation does not predict the result of the December 31, 2004 valuation or of any other future actuarial valuation. (Future activities can affect future valuation results in an unpredictable manner.) Rather, the supplemental valuation gives an indication of the probable effect of **only the benefit changes** on future valuations without comment on the complete end result of the future valuations. Actuarial assumptions and methods were consistent with those used in the regular actuarial valuation of the retirement system as of December 31, 2003, unless otherwise indicated. In particular, the assumed rate of investment return was 8.00% and the assumed rate of payroll growth was 4.00%.

These calculations are based upon assumptions regarding future events, which may or may not materialize. It is also based upon present and proposed plan provisions that are outlined in the report. If you have reason to believe that the assumptions that were used are unreasonable, that the plan provisions are incorrectly described, that important plan provisions are not described, or that conditions have changed since the calculations were made, you should contact the author(s) of this report prior to relying on information in the report. Also, in the event that more than one plan change is being considered, it is very important to remember that the results of separate actuarial valuations cannot generally be added together to produce a total. The total can be considerably greater than the sum of the parts due to the interaction of various plan provisions with each other, and with the assumptions that must be used.

A brief summary of the data used in this valuation is given below:

Membership as of December 31, 2003

			Averages in Years	
	Number	**Total Payroll**	**Age**	**Service**
Active	1,542	$81,737,962	36.1	11.5

Ohio State Highway Patrol Retirement System
Supplemental Actuarial Valuation - December 31, 2003
Deferred Retirement Option Program (DROP)

DROP Provisions Valued:

(1) Members would be eligible for a one-time election to "DROP in" upon attainment of age 48 with 20 years of service credit. For current active members who are past their age of first eligibility, they would make the election upon creation of the DROP.

(2) During participation in the DROP, members continue to make contributions based upon the 10% member contribution rate. While participating in the DROP, **100%** of members' contributions are deposited to their DROP account.

(3) 100% of the member's computed benefit (based upon service and salary at time of DROP), including any scheduled 3% post-retirement increases, would be credited to the member's DROP account.

(4) The DROP account would be credited with interest annually based upon a rate of return earned on a selected group of cash equivalent type investments.

(5) A member who "DROPs in" must stay in the DROP for a minimum period of time based on age at time of "DROPing in". A minimum participation period of 3 years for members who "DROP in" prior to age 52 and 2 years for members who "DROP in" on or after age 52. After a maximum of 8 years in the DROP program or attaining age 60, the member who entered the DROP program must retire.

(6) If the member "DROPs in", the member's annual benefit when the member "DROPs out" (i.e. retires) is based upon the benefit calculations at time of the "DROP in", including any post-retirement increases that may have accrued during the DROP participation period.

(7) If, during participation in the DROP, a member becomes disabled due to a duty related injury/illness, the member can choose to 1) have a disability pension benefit calculated based on the assumption that participation in the DROP did not occur, or 2) the member can elect to accept the age/service pension benefit achieved through DROP participation plus the accumulation in the DROP account. Duty disability benefit recipients will not suffer the loss of accumulated interest for early departure from the DROP.

(8) Once a member elects to participate in the DROP, their contributions are committed for the minimum period (2 or 3 years). If the member voluntarily discontinues DROP participation prior to the minimum participation period, the member will not receive any interest accumulated in the DROP account but will receive all accumulated pension benefits and pension contributions deposited into the DROP account at the end of the minimum participation period.

Ohio State Highway Patrol Retirement System
Supplemental Actuarial Valuation - December 31, 2003
Deferred Retirement Option Program (DROP)

Assumptions Used Related to the DROP:

(1) It was assumed that members eligible to DROP would either retire or "DROP in" at first eligibility for unreduced retirement. Current retirement rates were adjusted according to the following:

Beginning at first age of eligibility, the normal retirement pattern is as follows:

% of current retirement rates = 85%, 0%, 25%, 50%, 100%, 150%, 200%, 200%. 100% of members still working 8 years after first reaching retirement eligibility are assumed to retire.

For example, for a member attaining first eligibility for unreduced retirement at age 48, the member has a 34% (85% x 40%) probability of retiring at age 48 and a 66% (100% - 34%) probability of "DROPing in".

(2) It was assumed that members' DROP accounts would be credited an annual rate of interest of 3% and that the DROP balances would be invested in the same fashion as other System assets.

(3) It was assumed that employer contributions would be made on DROP participants' payroll, and that they would be used to finance Retirement System benefits (i.e. they would not be deposited to a member's DROP account).

Ohio State Highway Patrol Retirement System
Supplemental Actuarial Valuation
December 31, 2003
Deferred Retirement Option Program (DROP)
Minimum DROP Participation Period Alternate 4

Proposed Minimum DROP Participation Period: The minimum DROP period is 3 years for someone electing to "Drop in" prior to attaining age 52 and 2 years for someone electing to "Drop in" on or after attaining age 52.

Actuarial Information: The following is an estimate of the change in the computed employer contribution rate that might occur in conjunction with the proposed DROP.

Employer Contribution Rate and Computed Amortization Period	**Maximum Retirement Age of 60**	**Proposed DROP Benefits (Including Maximum Retirement Age of 60)**
As a % of Total Active Payroll		
Current Employer Contribution Rate	22.00%	22.00%
Change in Normal Cost	NA	0.00
Change in UAAL (30 year financing)	NA	0.03
Employer Rate Including Proposed Change	**22.00%**	**22.03%**
Computed Amortization Period		
Current Computed Amortization Period*	29 years	29 years
Effect on Amortization Years if no Rate Change	NA	+0 years

* Based upon an employer contribution rate of 22.00% of payroll and member contribution rate of 10.0% of payroll to the pension program of the Retirement System.

The following table shows the expected average retirement age based upon the benefit provisions:

	Maximum Retirement Age of 60	**Proposed DROP Benefits (Including Maximum Retirement Age of 60)**
Expected Average Retirement Age in Years	51.84	53.15

Ohio State Highway Patrol Retirement System
Supplemental Actuarial Valuation
December 31, 2003
Deferred Retirement Option Program (DROP)
Comments

Comments:

(1) The rates of retirement assumed in connection with this study were developed following consultation with the Board. As illustrated on the previous page, the rates imply that on average, the DROP will induce people to work 1.3 years longer than they otherwise would have worked. This is an absolutely critical assumption. If this assumption is not met, the plan will not be cost neutral, unless other sources of savings materialize. After 5 years of experience are available under the DROP, an experience study can be performed, that will give some indication of the effect of the DROP on retirements. The full effects may not be fully measurable until 10 years have elapsed.

(2) If, due to the proposed DROP, members in fact retire later than at present, some potential savings may result in the retiree health plan. The results presented on page 3 do not include a measurement of these potential savings. Such savings cannot be estimated reliably, since the HPRS retiree health plan is largely a secondary payer for many younger retirees.

(3) This supplemental valuation is based upon the presumption that the early exit penalty described on page 2, point 8 will be sufficient to keep people in the DROP for at least the minimum participation period. If this is not the case, the plan will not be cost neutral.

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March 3, 2016

Mr. Mark Atkeson, Executive Director
Ohio State Highway Patrol
Retirement System
1900 Polaris Parkway, Suite 201
Columbus, Ohio 43240-4037

Dear Mark:

Enclosed are 20 copies of the report of the 5-year actuarial investigation of the DROP covering the period from January 1, 2010 through December 31, 2014.

We look forward to meeting and discussing the results of this study with the Board.

Sincerely,

Mita D. Drazilov

MDD:bd

Enclosures