October 27, 2017

Board of Trustees
Ohio Police & Fire Pension Fund
140 East Town Street
Columbus, Ohio 43215

Re: Actuarial Investigation of the DROP Required under §742.14(F) of the Ohio Revised Code

Members of the Board:

This report presents the results of the actuarial investigation of the DROP of the Ohio Police & Fire Pension Fund. This report was prepared in accordance with §742.14(F) of the Ohio Revised Code, which states:

> At least once in each quinquennial 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 742.43 of the Revised Code. The investigation shall include an examination of the financial impact, if any, on OP&F 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 OP&F 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 OP&F, the Board may modify the plan or cease to allow members who have not already done so to elect to participate in the plan. The firefighter and police officers employers' contributions shall not be increased to offset any negative financial impact of the plan.

> If the Board ceases to allow members to elect to participate in the plan, the rights and obligations of members who have already elected to participate shall not be altered.

Our analysis shows that the DROP, as currently in effect, is cost neutral. This report documents the basis for that conclusion.

Background

The Deferred Retirement Option Plan (DROP) is a voluntary benefit introduced in 2002 by Senate Bill 134 with the goal of encouraging members to defer retirement. Effective Jan. 1, 2003, active members of OP&F could elect to enter the DROP if eligible for Normal Retirement. Briefly, when a member elects to enter the DROP:

- The member's pension benefit is calculated upon entry into the DROP as if the DROP entry date was the member's retirement date.

- The DROP account balance is credited until retirement with the member's retirement benefit amount for the year, adjusted for cost-of-living, (except those that enter DROP after July 1, 2013 will not receive a COLA during DROP) plus a portion of the member's contribution for the year, plus interest credited at the 10-year U.S. Treasury Note Business Day Series, as published by the United States Federal Reserve, and capped at a maximum of 5.0% compounded annually.

- Annual member contributions are credited to the DROP account based on the following schedule:
  - Years 1 and 2 (years 1, 2 and 3 for those who enter DROP after July 1, 2013) - 50% of member's contribution
  - Year 3 (years 4 and 5 for those that enter DROP after July 1, 2013) - 75% of member's contribution
  - Years 4-8 (years 6, 7 and 8 for those that enter DROP after July 1, 2013) - 100% of member's contribution
- Upon retirement, the member receives the monthly benefits calculated upon entry into the DROP, with COLAs as appropriate, and can begin to withdraw funds from the DROP account.

The DROP was implemented with the stipulation that it would not have a negative financial impact on OP&F. A DROP that has no negative financial impact on a Fund is also said to be "cost neutral". To be cost neutral, the savings or revenues generated by the DROP must cover the costs of the additional DROP benefits.

The DROP does generate savings and contribution revenue through the extension of careers. The DROP participants do not receive retiree health care benefits while in the DROP, so the cost of OP&F's retiree health care decreases. OP&F continues to receive all employer and some member contributions on behalf of the DROP participants. The longer that a member delays retirement, the higher the amount of retiree health care savings and contribution revenues generated for OP&F.

The DROP does increase the cost of the pension benefits provided. The DROP enables members to start to collect their pension payments in the DROP account before they retire. While the member does receive a smaller annuity benefit under the DROP because that benefit is calculated based on service and average annual salary as of the DROP entry date, these benefits are paid over a longer period of time. In addition, the DROP account is credited with a portion of the member contributions and interest.

The question central to determining if the DROP is cost neutral is this: How long does the DROP delay retirements? If members retiree at the same time with the DROP than they would have without the DROP, then no retiree health care savings or contribution revenue would be generated to cover the higher cost of the DROP benefits. The DROP must change member behavior by encouraging a significant delay in retirement to result in a cost neutral DROP. If retirement is delayed, the annual cost of providing benefits is lower because there is a longer period of time to fund for these benefits.

Extensive actuarial analysis was done before the Jan. 1, 2003 effective date of the DROP to determine if the OP&F DROP was cost neutral:

- Reports by Watson Wyatt Worldwide dated Mar. 16, 1999 and July 19, 2001
- Report by The Segal Company dated Nov. 21, 2002.

After the Jan. 1, 2003 effective date of the DROP, another extensive actuarial analysis was done to determine if the OP&F DROP was cost neutral:

- Reports by Buck Consultants dated Apr. 28, 2008 and Feb. 19, 2013.

Readers of this report are encouraged to read those reports.

All five reports concluded that the OP&F DROP design was cost neutral. The key conclusion in all five reports was that retirements needed to be delayed for the DROP design to be cost neutral. The first three reports were all based on projected retirement patterns under the OP&F DROP design, rather than actual experience, because no members had been exposed to a full eight-year DROP period. To the extent that actual retirement patterns differ from the retirement pattern projected in those reports, the cost neutral conclusion could be reversed. The fourth report reflected experience for the first full eight-year period and was based on new assumed rates of retirement adopted as of Jan. 1, 2012 based on the quinquennial actuarial experience study for the years 2007 through 2011. The conclusion of the fourth report was that DROP was extending employee careers even further than projected by the original three reports, and that DROP was cost neutral.

Basis for Analysis

§742.14(F) of the Ohio Revised Code is silent as to how the determination of no financial impact, or cost neutrality, is to be determined. This determination can be made using several methods. For the 2008 report, because the DROP experience was incomplete in that it did not have the benefit of at least a full maximum DROP period of eight years, the method used was to compare the present value of projected cash flows with the DROP to the present values without the DROP for all members of OP&F through the date of the analysis. The present values that were compared included: pension benefits paid from OP&F, employer and employee contributions made to OP&F, retiree health care benefits paid from OP&F, and administrative expenses. The 2008 report, and the prior reports, made use of the present value comparison basis and came to the same conclusion – that DROP would be cost neutral if the trend in the delay in retirements continued.

Starting with the Feb. 19, 2013 analysis, OP&F had enough DROP experience to reflect that experience in the assumptions used for the actuarial valuations and the DROP studies. As a result, the 2013 analysis and this 2017 analysis were able to use a different method to determine cost neutrality. The new method reviews the normal cost, which is the annual cost of providing benefits for future retirees, based on two scenarios:

- Normal Cost with DROP – actuarial normal cost based on the current DROP program and the Jan. 1, 2017 actuarial valuation

- Normal Cost without DROP – actuarial normal cost, assuming there is no DROP program, based on the Jan. 1, 2017 actuarial valuation, adjusted as follows:
    o DROP provisions are not included
    o Normal and disability retirement rates are based upon on the Jan. 1, 2002 actuarial valuation retirement patterns to estimate retirement behavior if no DROP program was in place.

We determined these amounts for both pensions and retiree health care. If the Normal Cost with DROP is no greater than the Normal Cost without DROP, the DROP is deemed cost neutral. It is our opinion the use of other methods, including the present value basis that was used in the past, would result in similar conclusions.

Unless otherwise noted, this report is based on the same census information, assumptions and methods and plan provisions used for the Jan. 1, 2017 actuarial valuations. For details, please refer to Conduent's

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reports of the Jan. 1, 2017 actuarial valuations for pension and health care, approved by the Board of Trustees Oct. 25, 2017. The 2002 service retirement and disability retirement rates used for the Normal Cost without DROP are attached to this report in Table 1.

Some key changes in the assumptions adopted by the Board of Trustees as of Jan. 1, 2017 and used in this analysis compared to the prior DROP analysis include:

- The assumed long-term rate of return was changed from 8.25% to 8%

- The assumed long-term salary increase rates were reduced by 50 basis points

- The assumed long-term DROP interest crediting rate was reduced from 4.5% to 4%

- The assumed annual benefit increases for CPI-based COLAs was reduced from 2.6% to 2.2%

- The assumed rates of retirement were changed to reflect slightly earlier service retirements and fewer disability retirements

Overall, the changes in assumptions reduced the normal costs compared to the prior assumptions.

Financial Analysis of Impact of DROP on OP&F

The financial impact of the DROP is measured in terms of the increase or decrease in normal cost as a percentage of pay. The normal cost is based on the entry age normal, level percentage of pay method and is net of administrative expenses. To be deemed cost neutral, the Normal Cost with DROP should be less than or equal to the Normal Cost without DROP, resulting in a savings due to DROP.

The following table shows that for both pension and retiree health care, the difference in normal cost is negative and therefore the DROP is cost neutral. The DROP results in a savings in normal cost of 2.89% of payroll for pension and 0.95% of payroll for retiree health care, for a total contribution savings of 3.84% of payroll per year.

Comparison of Normal Costs on a With DROP and Without DROP Basis as of Jan. 1, 2017			
Item	**Pensions**	**Retiree Healthcare**	**Total**
Cost (Savings) due to DROP as a percentage of pay:			
• Normal Cost with DROP	14.14%	3.13%	17.27%
• Normal Cost without DROP	17.03%	4.08%	21.11%
• Cost (Savings) due to DROP	(2.89)%	(0.95)%	(3.84)%
Cost (Savings) due to DROP in $ Millions (2017):			
• Normal Cost with DROP	$ 261.82	$ 57.94	$ 319.76
• Normal Cost without DROP	311.64	74.65	386.29
• Cost (Savings) due to DROP	$ (49.82)	$ (16.71)	$ (66.53)

To simplify the analysis, the figures above are for active members currently not in DROP. These figures reflect the retirement experience of those in DROP through the assumptions used in the actuarial valuation. In our opinion, including all members would not materially impact the conclusion.
We have not included administrative costs in our analysis. However, given the magnitude of the administrative costs for DROP on an ongoing basis being less than $100,000 annually, as estimated by OP&F, when compared to the numbers above, it is reasonable to conclude that the administrative expenses do not change the conclusion of this analysis.

The number of active members counted in this analysis consisted of 19,400 whose normal retirement age is 48 with 25 years of credited service and 4,673 whose normal retirement age is 52 with 25 years of credited service. The average expected retirement age is 57.81, based on the 2017 actuarial assumptions. Without DROP, using the 2002 retirement rates, the average retirement age would be 54.90, or 2.91 years earlier, and with the 2002 retirement and disability rates, the average retirement age would be 54.52, or a total of 3.29 years earlier than based on the with-DROP assumptions.

It is worth noting that when DROP was introduced, it was expected to increase pension costs by an amount that would be offset by savings in retiree health care costs. Based on the 2017 assumptions, which reflect retirements occurring later than the assumption used in the original analyses for DROP and a significant reduction in assumed disability retirements, and due to changes made to the DROP program itself to reduce cost, such as eliminating COLAs during DROP for members who enter DROP after July 1, 2013, the DROP has reduced pension costs and is cost neutral even without the savings from retiree health care.

We stress tested our analysis on the pension results for variances in the pre-DROP assumptions and we concluded there is enough normal cost savings in the analysis to withstand some significant variances in the without-DROP assumptions.

- We replaced the without-DROP disability rates with the 2017 disability rates, which would be appropriate if it is assumed DROP had nothing to do with the significant reduction in disability retirements since 2002. The result was the normal cost savings decreased was from 2.89% to 0.97%, but there was still savings.

- We then replaced both the without-DROP retirement and disability rates with the 2017 retirement and disability rates, which would be appropriate if it is assumed DROP had nothing to do with the reduction in disabilities and the delayed retirement ages since 2002. The result in this case was the normal cost savings of 2.89% of pay for DROP became a cost increase of 0.48% of pay. Thus, in the unlikely and, in our opinion, improbable event retirement patterns would have reached the current levels even without DROP, DROP would result in a cost to OP&F. However, if we assume a more reasonable alternative assumption, that behavior without DROP is somewhere in between the 2002 assumptions and 2017 assumptions, DROP would still produce cost savings for OP&F.

Conclusions and Recommendations

Based on the results of this actuarial investigation, it does appear that the DROP has continued to achieve a primary objective of providing an incentive for the most experienced officers on the job to continue working by extending careers by about three years on average. As a result of this extension of

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careers, the annual cost of providing pensions and retiree health care benefits is less under DROP. Because offering DROP does not result in additional annual costs to OP&F, the DROP is cost neutral.

While we have significant experience upon which to base future retirement patterns, we recommend that the Board of Trustees direct Conduent to continue to review the emerging retirement experience under the DROP annually with each actuarial valuation for the foreseeable future and report on whether the delay in retirement is being maintained.
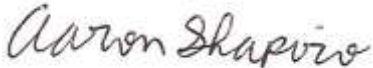
The purpose of this report is to analyze the OP&F DROP program as required under §742.14(F) of the Ohio Revised Code. Use of this report for any other purpose may not be appropriate and may result in mistaken conclusions due to failure to understand applicable assumptions, methodologies, or inapplicability of the report for that purpose. Conduent will not accept any liability for any statement made about this report without prior review by Conduent.

Future actuarial measurements may differ significantly from current measurements due to plan experience differing from that anticipated by the economic and demographic assumptions, increases or decreases expected as part of the natural operation of the methodology used for these measurements, and changes in plan provisions or applicable law. Because of limited scope, Conduent performed no analysis of the potential range of such future differences.

The undersigned are Members of the American Academy of Actuaries and meet the Academy's Qualification Standards to issue this Statement of Actuarial Opinion.

Please call if you have any questions.

Sincerely,

Aaron Shapiro, FSA, EA, MAAA
Principal, Consulting Actuary

Paul Wilkinson, ASA, EA, MAAA
Director, Consulting Actuary

AS/PW
19428/OPF 10252017_2017 DROP Cost Neutrality Review.docx
cc: John Gallagher
        Scott Miller

TABLE 1
Supplement to the Summary of Actuarial Assumptions

The 2017 Actuarial Investigation of the DROP, required under §742.14(F) of the Ohio Revised Code, uses the actuarial assumptions and methods used for the Jan. 1, 2017 actuarial valuations for pension and retiree health care. Please refer to Conduent's Jan. 1, 2017 Actuarial Valuation Reports, as approved by the OP&F Board of Trustees Oct. 25, 2017, for a summary of those assumptions.

The analysis for without-DROP uses the same assumptions as for with-DROP except for the service retirement and disability retirement rates, which are the rates in effect for the Jan. 1, 2002 actuarial valuation, before DROP was effective. The 2002 rates were based on a normal retirement age of 48 with 25 years of credited service. SB 340 increased the normal retirement age to 52 for members hired post-July 1, 2013, so this analysis developed a version of the 2002 retirement rates for post-July 1 2013 hires. The retirement rates for post-July 1, 2013 hires are the same as the 2002 rates used for the pre-July 1, 2013 hires except the rates for ages 52 to 57 have been replaced with the rates for ages 48 to 53 and the rates for under age 52 are zero.

Retirement Rate

Age	Police		Fire	
	Hired After July 1, 2013	Hired After July 1, 2013	Hired After July 1, 2013	Hired After July 1, 2013
48	35%		35%	
49	25%		25%	
50	25%		25%	
51	25%		25%	
52	25%	35%	25%	35%
53	25%	25%	25%	25%
54	20%	25%	25%	25%
55	20%	25%	25%	25%
56	20%	25%	25%	25%
57	20%	25%	25%	25%
58	20%	20%	25%	25%
59	20%	20%	25%	25%
60	20%	20%	35%	35%
61	25%	25%	35%	35%
62	25%	25%	35%	35%
63	25%	25%	35%	35%
64	25%	25%	35%	35%
>=65	100%	100%	100%	100%

TABLE 1

Supplement to the Summary of Actuarial Assumptions
(Continued)

Rates of Disability

Age	Police	Fire	Age	Police	Fire
<=18	0.000%	0.000%	51	2.471%	2.607%
19	0.002%	0.004%	52	2.559%	2.843%
20	0.002%	0.004%	53	2.604%	3.089%
21	0.002%	0.004%	54	2.611%	3.327%
22	0.002%	0.004%	55	2.583%	3.526%
23	0.005%	0.004%	56	2.547%	3.737%
24	0.012%	0.008%	57	2.513%	3.885%
25	0.020%	0.015%	58	2.507%	4.008%
26	0.032%	0.036%	59	2.507%	4.100%
27	0.055%	0.049%	60	2.513%	4.172%
28	0.084%	0.063%	61	2.532%	4.075%
29	0.125%	0.079%	62	2.545%	3.964%
30	0.177%	0.100%	63	2.539%	3.787%
31	0.240%	0.125%	64	2.540%	3.679%
32	0.313%	0.157%	>=65	0.000%	0.000%
33	0.394%	0.195%			
34	0.485%	0.231%			
35	0.584%	0.266%			
36	0.688%	0.303%			
37	0.793%	0.341%			
38	0.901%	0.381%			
39	1.002%	0.430%			
40	1.102%	0.494%			
41	1.204%	0.582%			
42	1.314%	0.699%			
43	1.430%	0.852%			
44	1.558%	1.048%			
45	1.689%	1.270%			
46	1.825%	1.503%			
47	1.958%	1.740%			
48	2.092%	1.965%			
49	2.226%	2.175%			
50	2.359%	2.390%			