OCC EXHIBIT NO. ______

BEFORE
THE PUBLIC UTILITIES COMMISSION OF OHIO

In the Matter of the Application of Aqua	)	
Ohio, Inc. for Authority to Increase Its	)	Case No. 16-907-WW-AIR
Rates and Charges for Its Waterworks	)	
Service.	)	

DIRECT TESTIMONY OF DANIEL J. DUANN, Ph.D.

On Behalf of
The Office of the Ohio Consumers' Counsel
10 West Broad Street, Suite 1800
Columbus, Ohio 43215-3485

December 19, 2016

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I. INTRODUCTION

Q1. PLEASE STATE YOUR NAME, BUSINESS ADDRESS AND POSITION.

A1. My name is Daniel J. Duann. My business address is 10 West Broad Street, Suite 1800, Columbus, Ohio, 43215. I am a Principal Regulatory Analyst with the Office of the Ohio Consumers' Counsel ("OCC").

Q2. PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND AND PROFESSIONAL EXPERIENCE.

A2. I received my Ph.D. degree in Public Policy Analysis from the Wharton School, University of Pennsylvania. I also have a M.S. degree in Energy Management and Policy from the University of Pennsylvania, and a M.A. degree in Economics from the University of Kansas. I completed my undergraduate study in Business Administration at the National Taiwan University, Taiwan, Republic of China. I was conferred by the Society of Utility and Regulatory Financial Analysts as a Certified Rate of Return Analyst in April 2011.

I was a Utility Examiner II in the Forecasting Section of the Ohio Division of Energy, Ohio Department of Development, from 1983 to 1985. The Forecasting Section was later transferred to the Public Utilities Commission of Ohio ("PUCO"). From 1985 to 1986, I was an Economist with the Center of Health Policy Research at the American Medical Association in Chicago. In late 1986, I joined the Illinois Commerce Commission as a Senior Economist at its Policy

Analysis and Research Division. I was employed as a Senior Institute Economist at the National Regulatory Research Institute ("NRRI") at The Ohio State University from 1987 to 1995. My work at NRRI involved public policy research and publications in many areas of utility regulation and energy policy. I was an independent business consultant from 1996 to 2007.

I joined the OCC in January 2008 as a Senior Regulatory Analyst. I was promoted to my current position in November 2011. My responsibilities are to assist the OCC by participating in various regulatory proceedings before the PUCO. These proceedings include rate cases, cost of capital, alternative regulation, fuel cost recovery, and other types of cases by Ohio's water, electric, and gas utilities.

Q3. HAVE YOU PREVIOUSLY SUBMITTED TESTIMONY OR TESTIFIED BEFORE THE PUBLIC UTILITIES COMMISSION OF OHIO?

A3. Yes. I have submitted expert testimony or testified on behalf of the OCC before the PUCO in a number of cases. A list of these cases is included in Attachment DJD-1.

Q4. HAVE YOU PREVIOUSLY SUBMITTED TESTIMONY OR TESTIFIED BEFORE OTHER REGULATORY AGENCY AND LEGISLATURE?

A4. Yes. I have testified before the Illinois Commerce Commission in 1987 and the California Legislature in 1989.

Q5. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A5. My testimony is to explain and support two objections (OCC Objection 13 and Objection 14) to the proposed cost of common equity and rate of return in the PUCO Staff Report of Investigation ("Staff Report").[1] I will also make several recommendations to the PUCO regarding the adoption of a fair and reasonable cost of common equity and rate of return for Aqua Ohio, Inc. ("Aqua" or "Utility") in this proceeding. My recommendations are important for protecting Aqua's consumers because the higher the cost of common equity and rate of return authorized by the PUCO, the higher the resulting charges imposed on consumers.

Q6. PLEASE SUMMARIZE YOUR RECOMMENDATION ON THE COST OF COMMON EQUITY AND RATE OF RETURN FOR AQUA.

A6. Based on my review of current financial market conditions and the relevant financial and operational information of Aqua and comparable investor-owned water companies, I recommend that the PUCO adopt two OCC-proposed adjustments to the Staff Report: (1) a "risk free return" of 2.75 percent used in the Capital Asset Pricing Model ("CAPM") and (2) the elimination of an adjustment to the cost of common equity for unsubstantiated equity issuance and other costs. If OCC's two recommendations were adopted by the PUCO, a fair and reasonable cost of common equity for the Utility should be no higher than

[1] See *In the Matter of the Application of Aqua Ohio, Inc., for Authority to Increase its Rates and Charges for its Waterworks Service,* Case No. 16-0907-WW-AIR, A report by the Staff of the Public Utilities Commission of Ohio (November 17, 2016).

eight percent and a rate of return should be no higher than 6.5 percent. This OCC-proposed rate of return will allow Aqua to maintain its financial integrity and its ability to attract needed capital for its regulated business operation. More importantly, this OCC-proposed rate of return of 6.5 percent, in combination with the adjustments proposed by other OCC witnesses, will ensure that the customers of Aqua will be paying a just and reasonable rate for water services.

II. OCC'S OBJECTIONS TO THE STAFF REPORT

Q7. PLEASE SUMMARIZE OCC'S OBJECTIONS TO THE STAFF REPORT.

A7. OCC objects to the "risk free return" proposed by the Staff in its CAPM analysis for Aqua's cost of common equity. This 6.1 percent "risk free return" proposed by the PUCO Staff is unfair and unreasonable.[2] A 6.1 percent "risk free return" is much higher than the one derived based on current financial market conditions and long-standing regulatory principles. OCC also objects to the PUCO Staff's proposed upward adjustment to the baseline cost of common equity for equity issuance and other costs.[3] This proposed equity issuance and other costs adjustment to the cost of common equity is unjustified and unreasonable. Aqua did not ask for this adjustment to its proposed cost of common equity in its Application and testimonies.[4] Aqua also did not demonstrate in its Application

[2] See Staff Report at 12.

[3] See Staff Report at 13.

[4] See *In the Matter of the Application of Aqua Ohio, Inc., for Authority to Increase its Rates and Charges for its Waterworks Service,* Case No. 16-0907-WW-AIR, Direct Testimony of Robert A. Kopas at 3 (June 14, 2016).

and testimonies that it is reasonable to include any past equity issuance costs to increase its cost of common equity.[5] Nor did Aqua substantiate that any such costs are likely to incur in the future.

Q8. PLEASE DESCRIBE YOUR UNDERSTANDING OF THE PUCO STAFF'S METHODOLOGY IN ESTIMATING THE COST OF COMMON EQUITY AND RATE OF RETURN.

A8. The PUCO Staff accepted the actual capital structure (48.05 percent debt and 51.95 percent equity) and the embedded cost rates of long-term debt (4.88 percent) proposed by Aqua Ohio.[6] As for the cost of common equity, the PUCO Staff proposed a range of 9.36 percent to 10.38 percent (with a mid-point of 9.87 percent).[7] This PUCO Staff-proposed range is derived from a baseline estimation of 9.17 percent to 10.17 percent (with a mid-point of 9.67 percent) and an upward adjustment factor of 1.2058 to account for the so-called equity issuance and other costs.[8] Based on these cost rates of capital items and the actual capital structure of Aqua, the PUCO Staff recommends a range of 7.21 percent to 7.74 percent (with a mid-point of 7.48 percent) for the overall rate of return.[9]

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[5] See *In the Matter of the Application of Aqua Ohio, Inc., for Authority to Increase its Rates and Charges for its Waterworks Service,* Case No. 16-0907-WW-AIR, Direct Testimony of Dylan W. D'Ascendis at 33-36 (June 14, 2016).

[6] See Staff Report at 12.

[7] See Staff Report at 13 and 120, Schedule D-1.1.

[8] Id.

[9] See Staff Report at 12.

The PUCO Staff calculated the baseline cost of common equity of 9.17 percent to 10.18 percent by averaging the results of its CAPM analysis and the Discounted Cash Flow ("DCF") analysis applied to four comparable publicly traded water companies.[10] For the CAPM analysis, the PUCO Staff used the average beta (0.7125) of the four comparable water companies reported in the Value Line Investment Survey.[11] The Staff proposed a "risk free return" of 6.1 percent and an equity risk premium (market spread) of six percent.[12] The "risk free return" was derived from the annualized long-term government bond return over an 89-year period of 1926 to 2014 reported in the *Ibbotson Stocks, Bonds, Bills, and Inflation (SBBI) 2015 Classic Yearbook.* The equity risk premium was the spread of annualized arithmetic means of market return rate (12.1 percent) and the risk free return (6.1 percent) over the same 89-year period and published in the same publication.[13] Using these financial data inputs, the PUCO Staff estimates the cost of common equity to be 10.375 percent under the CAPM analysis.[14] The CAPM result is calculated by the PUCO Staff as following:

CAPM = Risk Free Return + beta * (Large Company Total Return – Risk Free Return)

Or

10.3750% = 6.10% + (0.7125) * (12.1% - 6.10%)

[10] See Staff Report at 13.

[11] See Staff Report at 13 and Schedule D-1.3, page 1 of 1.

[12] See Staff Report at 12.

[13] See *Ibbotson Stocks, Bonds, Bills, and Inflation (SBBI) 2015 Classic Yearbook* at 39-40 and Table 2-1.

[14] See Staff Report at 12 and Schedule D-1.3, page 1 of 1.

For the DCF analysis, the PUCO Staff calculated the cost of common equity for each of the four comparable water companies and used the average of the group as the cost of common equity for Aqua. The cost of common equity of an individual water company is the internal rate of return calculated based on the formula that the current average stock price equates to the current value of an expected stream of annual dividends.[15] Using the DCF model, the PUCO Staff estimates the cost of common equity of Aqua to be 8.96 percent.[16]

The PUCO Staff recommends a baseline cost of common equity of 9.67 percent, which is the average of the cost of common equity derived from the CAPM analysis (10.375 percent) and the DCF analysis (8.96 percent).[17] The PUCO Staff then, assuming a 100 basis point range of uncertainty, proposed a baseline range for Aqua Ohio's cost of equity of 9.17 percent to 10.17 percent.[18] After that, the PUCO Staff makes an additional allowance for equity issuance and other costs, resulting in an adjustment factor of 1.02058.[19] The PUCO Staff's final recommended range of cost of common equity is 9.36 percent to 10.38 percent.[20]

[15] See Staff Report at 13.

[16] Id.

[17] 9.67% = (10.375% + 8.96%) / 2.

[18] See Staff Report at 13.

[19] See Staff Report at 120, Schedule D-1.1.

[20] See Staff Report at 13 and 120, Schedule D-1.1.

Q9. ***PLEASE EXPLAIN "RISK FREE RETURN" AND ITS SIGNIFICANCE IN ESTIMATING THE COST OF COMMON EQUITY.***

A9. The "risk free return" is one of the three building blocks of the CAPM analysis typically used in estimating the cost of common equity. The "risk free return" is usually derived from the current yield (or interest rate) of long-term (usually from ten-year maturity to 30-year maturity) United States Government Bonds. These United States Government Bonds are not risk free in absolute term, but they generally carry the highest bond ratings and are considered to be very low risk. The current yields of these government bonds are considered by most financial analysts as an excellent proxy for risk-free return. The yields of long-term United States Government Bonds are regularly published in many financial publications. An example of the current yields (or interest rate) of long-term United States Government Bonds is shown in Attachment DJD-2. More detailed information on the daily yields of these Bonds going back more than fifteen years are also available on the same website.

Under a typical CAPM analysis, the choice of a higher "risk free return" will lead to a higher estimated cost of common equity assuming the same average beta and risk premium. Consequently, when the PUCO Staff choose to use an inflated and unreasonable "risk free return" such as the 6.1 percent used in this proceeding, the estimated cost of common equity under the CAPM analysis will be overstated and unreasonable. This in turn will unreasonably overstate the cost of common equity and the rate of return for Aqua.

Q10. PLEASE EXPLAIN WHY THE 6.1 PERCENT "RISK-FREE RETURN" PROPOSED BY THE PUCO STAFF IS INFLATED AND UNREASONABLE.

A10. There are many reasons why the 6.1 percent "risk free return" proposed by the Staff is inflated and unreasonable. First, the Staff-proposed "risk free return" of 6.1 percent is not supported by current financial market conditions. There is no factual basis for the PUCO Staff to use a 6.1 percent "risk-free return" in its CAPM analysis. As discussed earlier, the "risk free return" is typically measured by the yields on long-term United States government bonds. These yields are readily available from many financial publications and government agencies. In this proceeding, the PUCO Staff chose not to use the directly observable current (2015 to 2016) market data and use instead a derived number that was the average annualized total returns of Long-Term Government Bonds (6.1 percent) over the entire 89-year period of 1926-2014.[21] The PUCO Staff is wrong in using this 6.1 percent "risk free return." The 6.1 percent may be considered as a reasonable representation of the average annual total return of long-term government bonds over the entire 89-year period (1926-2014), it certainly does not reflect the yields of government bonds with 10-year to 30-year maturity as of late 2016. More specifically, this proposed 6.1 percent "risk free return" is almost three times as higher than the Staff's own calculation of the average yields (as of July 29, 2016

[21] See *Ibbotson Stocks, Bonds, Bills, and Inflation (SBBI) 2015 Classic Yearbook* at 39-40 and Table 2-1.

for both 10-year and 30-year maturity) of long-term U.S. Treasury Bonds at 2.205 percent.[22] See Attachment DJD-3.

Second, the Staff-proposed "risk free return" of 6.1 percent is inconsistent with long-established regulatory principles and PUCO precedents. Specifically, this proposed "risk free return" of 6.1 percent, clearly being out of step with the current United States economic and financial conditions of 2016, is inconsistent with the regulatory principles well-established in the *Bluefield* decision where the United States Supreme Court stated:

> A public utility is entitled to such rates as will permit it to earn a return on the value of the property which it employs for the convenience of the public equal to that generally being made **at the same time and in the same general part of the country** on investments in other business undertakings which are attended by corresponding risks and uncertainties;[23]

Similarly, in the past and over an extended period of time, the PUCO Staff routinely used the average yields of United States Government Bonds of maturity over ten years as the proxy of "risk free return" in many water, electric and gas rate cases. It is not clear from the Staff Report why this proxy of "risk free

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[22] See Staff Report, Schedule D-1.3.

[23] *Bluefield Water Works & Improvement Co. v. Pub. Serv. Comm'n*, 262 U.S. 679, 692 (1923) (emphasis added).

return" that has been used consistently in the past rate case was not recommended in this case.

Third, the Staff-proposed 6.1 percent "risk free return" is unreasonable because it leads to results that are inconsistent with proven and sound financial and economic analysis. Specifically, this 6.1 percent "risk-free return" is even higher than embedded debt cost (4.88%) of Aqua.[24] This is clearly an unreasonable outcome that can further demonstrate that the Staff-proposed "risk free return" of 6.1 percent is unreasonable and overstated. Proven and sound financial analysis will indicate that the yields or "risk-free return" associated with long-term United States Government Bonds should be lower than the embedded cost of debt of a company such as Aqua that has a lower credit rating and is considered to be riskier than the United States Government in repaying its debt. A properly selected "risk free return" associated with long-term United States Government Bonds should be lower than the embedded cost of debt, 4.88 percent, of Aqua, an investor-owned water company. In addition, the Staff-proposed "risk free return" of 6.1 percent is significantly higher than the "risk-free return" of 3.53 percent proposed by Aqua in estimating its cost of common equity as well as by a number of rate of return analysts in recent proceedings before the PUCO.[25] The Aqua-proposed "risk free return" of 3.53 percent is already overstated because it is

[24] See Testimony of Kopas at 4.

[25] See Testimony of D'Ascendis at 16 and Schedule DWD-4, page 2 of 11, Column [6].

based on forecasted interest rates that tend to be much higher than the current interest rates or interest rates actually materialized in the past.

In summary, the Staff's recommended cost of common equity is overstated and unreasonable as a result of using this inflated and unreasonable "risk free return" of 6.1 percent. The resulting rate of return as proposed by the PUCO Staff will be overstated and unreasonable for consumers to pay.

Q11. PLEASE EXPLAIN WHY THE STAFF-PROPOSED ISSUANCE AND OTHER COSTS ADJUSTMENT IS UNREASONABLE AND SHOULD NOT BE ADOPTED.

A11. The PUCO Staff proposed to increase the cost of common equity of Aqua by applying an adjustment factor of 1.02058 to account for equity issuance and other costs.[26] By doing so, the proposed cost of common equity for Aqua would increase from a range of 9.17 percent to 10.17 percent to a range of 9.36 percent to 10.38 percent.[27] This adjustment for equity issuance and other costs to the baseline cost of common equity is inappropriate and not needed. In its Application and testimony, Aqua did not provide sufficient support for an adjustment to its cost of common equity for equity issuance and other costs. Only a general discussion related to the recognition of flotation (or equity issuance)

[26] See Staff Report at 13 and Schedule D-1.1.

[27] See Staff Report at 13.

costs in the proposed common equity cost rate was made.[28] Aqua did not provide any documentation or proof that it would incur such costs in the reasonably near future. Aqua does mention an estimated flotation cost allowance of 0.13 percent (13 basis points) as a possible addition to its Indicated Common Equity Cost Rate of 10.25 percent.[29] However, Aqua does not include this so-called Flotation Cost Adjustment in its final requested cost of common equity of 10.25 percent. Aqua did not ask for this equity and other costs allowance. And, Aqua has not substantiated that it was reasonable to increase its cost of common equity to account for these costs. Consequently, there is no need to make this adjustment. It is unreasonable for the PUCO Staff to make this adjustment.

III. OCC'S RECOMMENDATIONS

Q12. PLEASE EXPLAIN OCC'S PROPOSED ADJUSTMENTS TO THE STAFF'S COST OF COMMON EQUITY.

A12. I propose two adjustments to the Staff's recommended cost of common equity. First, I propose to use a "risk free return" of 2.75 percent instead of the 6.10 percent used by the PUCO Staff in its CAPM analysis. I have reviewed the actual current yields of long-term United States Government Bonds, and the "risk free returns" used by other financial analysts in recent proceedings before the PUCO. They all show a much lower yield or "risk free return" than the 6.1 percent

[28] See Direct Testimony of D'Ascendis at 33-36.

[29] See Direct Testimony of D'Ascendis at 3-4 and Direct Testimony of Kopas at 3.

proposed in the Staff Report. This OCC-proposed adjustment of using a "risk free return" of 2.75 percent will lower the result of the CAPM analysis to 7.03 percent from 10.375 percent proposed by the PUCO Staff. This calculation is summarized here:

CAPM = Risk Free Return + beta * (Large Company Total Return – Risk Free Return)

or

7.03% = 2.75% + (0.7125) * (12.1 – 6.1%)

It should be noted that I did not propose an adjustment to the risk premium (or market spread) of six percent used by the PUCO Staff in its CAPM analysis.[30] This six percent risk premium (proposed by the Staff and adopted by OCC) is calculated by deducting the annualized total return of Long-Term Government Bonds (6.1 percent) from the annualized total return of Large Cap Stocks (12.1 percent) over the entire 89-year period (1926-2014). Using the difference in the annualized returns of different asset classes over a long period of time is a reasonable approach in estimating the risk premium used for the CAPM analysis. It provides a stable and consistent estimate of risk premium that does not fluctuate dramatically one year from the other.

The result of the Staff's DCF analysis will not be affected by the OCC-proposed adjustment of using a lower risk free return. The DCF result remains at 8.96 percent. If the OCC's proposed adjustment of lowering the "risk free return" is

[30] See Staff Report at 12.

adopted, the baseline cost of common equity (as an average of the CAPM and the DCF results), will be reduced to eight percent. That is:

8% = (7.03% + 8.96%) / 2.

This is a significant reduction in the cost of common equity from the Staff-proposed range of 9.17 percent to 10.17 percent (with a midpoint of 9.67 percent) for the baseline cost of common equity.

Second, I propose to eliminate the unneeded and unreasonable adjustment of the cost of common equity to account for any so-called "issuance and other costs adjustment factor." This second OCC-proposed adjustment, if adopted, will keep the cost of common equity at eight percent and prevent any unreasonable increase of the cost of common equity from eight percent to a higher level.

Q13. PLEASE EXPLAIN OCC'S PROPOSED CAPITAL STRUCTURE AND COST OF DEBT.

A13. In developing my rate of return recommendation, I propose to use the actual capital structure of Aqua (48.05 percent debt and 51.95 percent equity) and the embedded cost of long-term debt of 4.88 percent. In other words, I propose the same capital structure and cost of debt used by Aqua and the PUCO Staff.

Q14. PLEASE SUMMARIZE OCC'S RECOMMENDATION ON THE COST OF COMMON EQUITY AND RATE OF RETURN FOR AQUA IN THIS PROCEEDING.

A14. Based on the cost rates of debt and common equity and the capital structure proposed by OCC, I recommend that the PUCO adopt a cost of common equity of eight percent and a rate of return of 6.50 percent for Aqua. A summary of the capital structure, cost rates and rate of return (or weighted cost of capital) is shown in Table 1.

TABLE 1: A SUMMARY OF PROPOSED CAPITAL STRUCTURE, COST RATES AND RATE OF RETURN

	% of Total	Costs (%)			Weighted Cost (%)		
		OCC	Staff	OAW	OCC	Staff	OAW
Long Term Debt	48.05	4.88	4.88	4.88	2.34	2.34	2.34
Common Equity	51.95	8.00	9.87[31]	10.25	4.16	5.13	5.33
Total Capital	100.00				6.50	7.48[32]	7.67

[31] The figure, 9.87%, listed in Table 1 is the mid-point of the PUCO Staff's range of estimates of cost of equity, 9.36% to 10.38%.

[32] The weighted cost of capital, 7.48%, shown in Table 1 is the mid-point of the Staff's range of estimates, 7.21% to 7.74%.

IV. CONCLUSION

Q15. DOES THIS CONCLUDE YOUR TESTIMONY?

A15. Yes. However, I reserve the right to supplement my testimony in the event that additional testimony is filed, or if new information or data in connection with this proceeding becomes available.

CERTIFICATE OF SERVICE

I hereby certify that a true copy of the foregoing *Direct Testimony of Daniel J. Duann, Ph.D. on Behalf of the Office of the Ohio Consumers' Counsel* was served via electronic transmission to the persons listed below on this 19th day of December 2016.

/s/ Kevin Moore
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Daniel J. Duann, Ph.D.
List of Testimonies Filed Before PUCO

1. *Application of The Dayton Power and Light Company for Approval of Its Electric Security Plan*, Case No. 08-1094-EL-SSO (January 26, 2009).

2. *Application of Ohio American Water Company to Increase Its Rates for Water and Sewer Service Provided to Its Entire Service Area*, Case No. 09-391-WS-AIR (January 4,2010).

3. *Application of Aqua Ohio, Inc. for Authority to Increase its Rates and Charges in its Masury Division*, Case No. 09-560-WW-AIR (February 22, 2010).

4. *Application of Aqua Ohio, Inc. for Authority to increase its Rates and Charges in its Lake Erie Division*, Case No. 09-1044-WW-AIR (June 21, 2010).

5. *In the Matter of the Fuel Adjustment Clauses for Columbus Southern Power Company and Ohio Power Company*, Case Nos. 09-872-EL-FAC and 09-873-EL-FAC (August 16, 2010).

6. *In the Matter of the Application of Columbus Southern Power Company for Approval of an Electric Security Plan; an Amendment to its Corporate Separation Plan; and the Sale or Transfer of Certain Generating Asset (Remand)*, Case Nos. 08-917-EL-SSO et al (June 30, 2011).

7. *In the Matter of the Application of The East Ohio Gas Company d/b/a Dominion East Ohio for Approval of Tariffs to Modify and further Accelerate its Pipeline Infrastructure Replacement Program and to Recover the Associated Costs et al.*, Case Nos. 11-2401-GA-ALT and 08-169-GA-ALT (July 15, 2011).

8. *In the Matter of the Application of Columbus Southern Power Company and Ohio Power Company for Authority to Establish a Standard Service Offer Pursuant to 4928.143, Ohio Rev. Code in the Form of an Electric Security Plan (ESP)*, Case Nos. 11-346-EL-SSO, et al (July 25,2011).

9. *In the Matter of the Application of Columbus Southern Power Company and Ohio Power Company for Authority to Merge and Related Approval (ESP Stipulation)*, Case Nos. 10-2376-EL-UNC, et al (September 27, 2011).

10. *In the Matter of the 2010 Annual Filing of Columbus Southern Power Company and Ohio Power Company Required by Rule 4901:1-35-10, Ohio Administrative Code,* Case Nos. 11-4571-EL-UNC and 11-4572-EL-UNC (October 12, 2011).

11. *In the Matter of the Application of Ohio American Water Company to Increase Its Rates for Water and Sewer Service Provided to Its Entire Service Area*, Case No. 11-4161-WS-AIR (March 1, 2012).

12. *In the Matter of the Application of Columbus Southern Power Company and Ohio Power Company for Authority to Establish a Standard Service Offer Pursuant to 4928.143, Ohio Rev. Code in the Form of an Electric Security Plan (Modified ESP)*, Case Nos. 11-346-EL-SSO, et al (May 4, 2012).

13. *In the Matter of the Application of Ohio Edison Company, The Cleveland Electric Illuminating Company, and The Toledo Edison Company For Authority to Establish a Standard Service Offer Pursuant to R.C. § 4928.143 in the Form Of an Electric Security Plan,* Case No. 12-1230-EL-SSO (May 21, 2012).

14. *In the Matter of the Application of Duke Energy Ohio, Inc., for an Increase in Electric Distribution Rates, et al.* Case Nos. 12-1682-EL-AIR (February 19, 2013).

15. *In the Matter of the Application of Duke Energy Ohio, Inc., for an Increase in Gas Rates,* Case Nos. 12-1685-GA-AIR, et al (February 25, 2013).

16. *In the Matter of the Application of Dayton Power & Light Company for Authority to Establish a Standard Service Offer in the Form Of an Electric Security Plan Pursuant to R.C. 4928.143,* Case No. 12-426-EL-SSO et al. (March 1, 2013).

17. *In the Matter of the Application of The Dayton Power and Light Company for Authority to Recover of Certain Storm-related Service Restoration Costs,* Case Nos. 12-3062-EL-RDR, et al. (January 31, 2014).

18. *In the Matter of the Application of The Dayton Power and Light Company for Authority to Recover of Certain Storm-related Service Restoration Costs,* Case Nos. 12-3062-EL-RDR, et al. (May 23, 2014).

19. *In the Matter of the Application of Aqua Ohio, Inc. to Increase Its Rates and Charges for Its Waterworks Service,* Case No. 13-2124-WW-AIR (August 4, 2014).

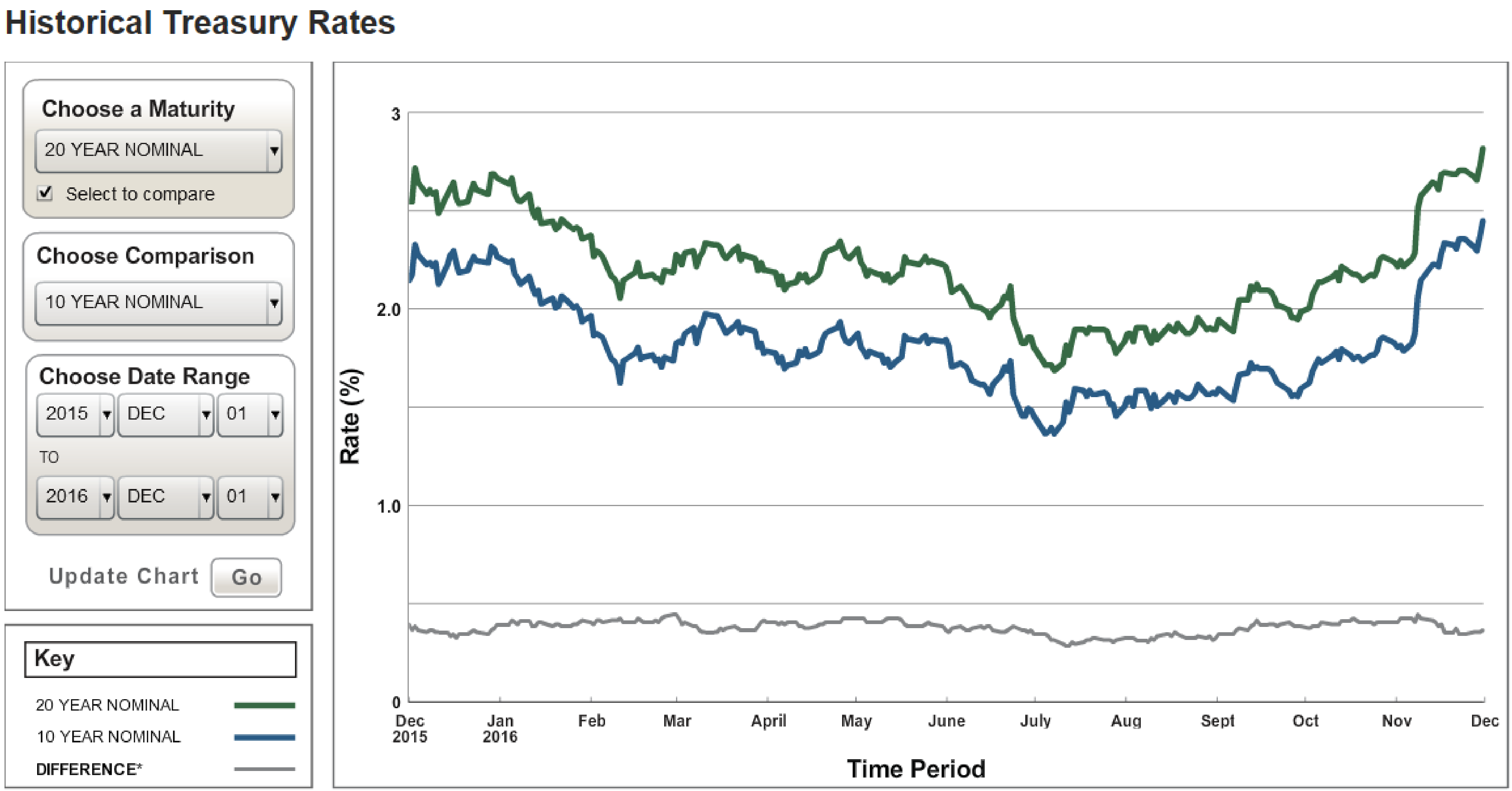
20. *In the Matter of the Application Seeking Approval of Ohio Power Company's Proposal to Enter into an Affiliate Power Purchase Agreement for Inclusion in the Power Purchase Agreement Ride,* Case No. 14-1693-EL-RDR, et al. (September 11, 2015).

21. *In the matter of the Application of Duke Energy Ohio, Inc. for Approval of an Alternative Rate Plan Pursuant to R.C. 4929.05, Revised Code, for an Accelerated Service Line Replacement Program*, Case No. 14-1622-GA-ALT (November 6, 2015).

22. *In the Matter of the Application of Ohio Edison Company, The Cleveland Electric Illuminating Company, and The Toledo Edison Company for Authority to Establish a Standard Service Offer Pursuant to R.C. 4928.141 in the Form of an Electric Security Plan,* Case No. 14-1297-EL-SSO (June 22, 2016).

23. *In the Matter of the Application of Ohio Power Company for Administration of the Significantly Excessive Earnings Test for 2014 Under Section 4928.143 (F), Revised Code, and Rule 4901:1-35-10, Ohio Administration Code.* 15-1022-EL-UNC et al. (August 15, 2016).
24. *In the Matter of the Application of Ohio Power Company for Administration of the Significantly Excessive Earnings Test for 2014 Under Section 4928.143 (F), Revised Code, and Rule 4901:1-35-10, Ohio Administration Code.* 15-1022-EL-UNC et al. (September 19, 2016).
25. *In the Matter of the Commission Review of the Capacity Charges of Ohio Power Company and Columbus Southern Power Company.* 10-2929-EL-UNC et al. (October 18, 2016).

U.S. Department of the Treasury



Source: https://www.treasury.gov/resource-center/data-chart-center/interest-rates/Pages/Historic-LongTerm-Rate-Data-Visualization.aspx

Aqua Ohio Inc.
PUCO Regulated Water Divisions
Case No. 16-0907-WW-AIR
CAPM Cost of Equity Estimate

Schedule D-1.3
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U.S. Treasuries[1]	Close 10 Yr Yld (%)	Close 30 Yr Yld (%)
Averages:		
Last 64 days	1.656%	2.443%
Last 127 days	1.742%	2.544%
Last 190 days	1.893%	2.680%
Last 252 days	1.951%	2.731%
Composite Averages:	1.811%	2.599%
Combined Average:	**2.205%**	

CAPM Cost of Equity Estimate = **10.3750%**

CAPM = risk free return[2] + β*(large company total return[3] - risk free return[2])
= 6.10% + (0.7125) * (12.1% - 6.10%)

Notes:
1 - As of July 29, 2016
2 - Ibbotson SBBI 2015 Classic Yearbook by Morningstar - Long-Term Government Bond Return
3 - Ibbotson SBBI 2015 Classic Yearbook by Morningstar - Large Company Total Return