

**A report by the staff of the
Public Utilities Commission of Ohio**

In the Matter of the Application of Aqua Ohio, Inc., for
Authority to Increase its Rates and Charges for its
Waterworks Service

Case Number 21-595-WW-AIR

February 11, 2022

BEFORE

THE PUBLIC UTILITIES COMMISSION OF OHIO

In the Matter of the Application of Aqua)
Ohio, Inc., for Authority to Increase its)
Rates and Charges for its Waterworks) Case No. 21-595-WW-AIR
Service)

Jenifer French, Chair
M. Beth Trombold, Commissioner
Daniel R. Conway, Commissioner
Dennis P. Deters, Commissioner
Lawrence K. Friedeman, Commissioner

To the Honorable Commission:

In accordance with the provisions of the Ohio Revised Code Section 4909.19, the Staff of the Public Utilities Commission of Ohio (Staff) has conducted its investigation in the above matter and hereby submits its findings to the Commissioners of the PUCO (Commission) in this Staff Report.

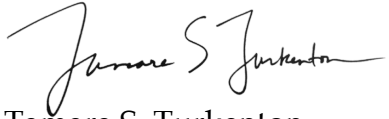
The Staff Report has been jointly prepared by the Staff's Rates & Analysis Department and Service Monitoring and Enforcement Department.

Copies of the Staff Report have been filed with the Docketing Division of the Public Utilities Commission of Ohio (PUCO) and served by certified mail upon the mayors of all affected municipalities and other public officials deemed representative of the service area affected by the application. A copy of this report has also been served upon the utility or its authorized representative. Interested parties are advised that written objections to any portion of the Staff Report must be filed within 30 days of the date of the filing of this report, after which time the Commission will promptly set this matter for public hearing. Written notice of the time, place, and date of such hearing will be served upon all parties to the proceeding.

The Staff Report is intended to present for the Commission's consideration the results of the Staff's investigation. It does not purport to reflect the views of the Commission nor should any party to the proceeding consider the Commission as bound in any manner by the representations or recommendations. The Staff Report, however, is legally cognizable evidence upon which the Commission may rely in reaching its decision in this matter. (See *Lindsey v. Pub. Util. Comm.*, 111 Ohio St. 6 (1924)).

Respectfully submitted,

PUCO Rates and Analysis Department

A handwritten signature in black ink, appearing to read "Tamara S. Turkenton". The signature is fluid and cursive, with the first name being the most prominent.

Tamara S. Turkenton
Director

PUCO Service Monitoring and Enforcement Department

A handwritten signature in blue ink, appearing to read "R. Fadley". The signature is cursive and somewhat stylized.

Robert Fadley
Director

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BACKGROUND

Aqua Ohio, Inc. (the Applicant or Aqua Ohio) is a public utility supplying water service to approximately 150,549 consumers within Ohio. The Applicant is the parent company of Aqua Ohio Wastewater, Inc. (AWI), which is a public utility providing wastewater service to approximately 6,937 consumers within Ohio. The Applicant is a subsidiary of Essential Utilities, Inc. (Essential). Essential is a holding company of several regulated public utility companies that provides water, wastewater, or natural gas service in ten states.

The Applicant's water operation consists of six operating divisions: Lake Erie, Ashtabula, Franklin County/Lawrence, Struthers, Stark/Mansfield/Portage, and Marion/Tiffin. The Applicant describes these operating divisions as follows:¹

- Lake Erie Division, serving approximately 32,319 water customers in the cities of Mentor and Mentor-on-the-Lake;
- Ashtabula Division, serving approximately 14,064 water customers in Ashtabula, the Village of North Kingsville and portions of surrounding townships in Ashtabula County;
- Franklin County/Lawrence Division, serving approximately 8,136 water customers and 6,773 wastewater customers in portions of Blendon, Madison, Norwich, Perry, Prairie, Sharon and Truro Townships. This division also serves approximately 3,817 water customers in the Village of Chesapeake, the Village of Burlington, portions of surrounding townships and Lake White in Pike County as well as seven water customers in Preble County adjacent to Richmond, Indiana;
- Struthers Division, serving approximately 23,235 water customers in the cities of Struthers and Campbell, the villages of Lowellville, Poland and New Middletown, the Townships of Beaver, Coitsville, Poland, Springfield and portions of Canfield and Boardman. This division is also responsible for operations serving approximately 1,426 water customers in Masury and serving approximately 273 water customers in Tomahawk;
- Stark/Mansfield/Portage Division, serving water to approximately 38,314 customers in the cities of Massillon and Green as well as portions of Stark County, 1,410 customers in ten separate smaller systems north and east of Mansfield in Richland County, approximately 913 customers in Brimfield service area (Beechcrest and Aurora East) located in Brimfield Township, approximately 978 customers in Mohawk, and approximately 227 customers in Firestone Trace. Additionally, Aqua serves approximately 164 wastewater customers in Firestone Trace and Southwoods Estates;
- Marion/Tiffin Division, serving approximately 25,437 water customers in the cities of Marion and Tiffin and portions of the adjacent townships in Marion and Seneca Counties.

The Applicant's last base rate case was Case No. 16-907-WW-AIR et al. On March 22, 2017, the Public Utilities Commission of Ohio (Commission) issued an Opinion and

¹ See Direct Testimony of Robert Davis on Behalf of Aqua Ohio, Inc.

Order approving the application of Aqua Ohio to increase its base rates and charges in its Lake Erie Division, Masury Division, and the service areas formerly served by Ohio American Water Company (OAW), Mohawk Utilities, Inc. (Mohawk), and Tomahawk Utilities, Inc. (Tomahawk).

On November 8, 2017, in Case No. 16-1848-ST-ACE et al., the Commission granted the joint application filed by Aqua Ohio and AWI to certify AWI as a public utility and transfer Aqua Ohio's wastewater operations to AWI, Aqua Ohio's wholly owned subsidiary.

On February 21, 2018, in Case No. 17-1717-WS-ACE et al., the Commission issued a Finding and Order approving Aqua Ohio and AWI's acquisitions of the assets and properties of Firestone Trace Homeowners' Association (Firestone Trace).

On December 12, 2018, in Case No. 18-1330-WS-ACE et al., the Commission issued a Finding and Order approving Aqua Ohio and AWI's acquisitions of the assets and properties of Southwoods Estates.

On February 6, 2019, in Case No. 18-337-WW-SIC, the Commission issued a Finding and Order approving a 3.66% system improvement charge for water service in its Lake Erie Division, Masury Division, and the service areas formerly served by OAW, Mohawk, and Tomahawk.

On October 23, 2019, in Case No. 19-567-WW-SIC, the Commission issued a Finding and Order approving a second system improvement charge of 3.733% for water service in its Lake Erie Division, Masury Division, and the service areas formerly served by OAW, Mohawk, and Tomahawk.

On December 18, 2019, in Case No. 19-1610-WS-UNC, et al., the Commission issued a Finding and Order approving Aqua Ohio's acquisitions of the assets and properties of the city of Campbell, Ohio, related to the provision of water service.

On September 23, 2020, in Case No. 20-532-WW-SIC, the Commission issued a Finding and Order approving a third system improvement charge of 3.498% for water service in its Lake Erie Division, Masury Division, and the service areas formerly served by OAW, Mohawk, and Tomahawk.

On May 21, 2021, and subsequently amended on May 28, 2021, the Applicant filed a notice of intent to file an application for an increase in rates to be charged and collected for water service in the Lake Erie and Masury divisions and those customers formerly served by OAW, Mohawk, Tomahawk, Firestone Trace, and Southwoods Estates. The application excludes the Stark and Struthers divisions and the service areas formerly served by the City of Campbell. The Applicant requested a test year beginning January 1, 2021, and ending December 31, 2021, and a date certain of December 31, 2021.

On June 28, 2021, the Applicant filed an application for a permanent rate increase together with the standard filing requirements. On July 16, 2021, the Applicant filed notice of supplemental Schedule B-3.2.

By its Entry on July 14, 2021, the Commission approved the requested date certain and test year.

The Applicant proposes additional base rate revenues of \$8,290,405, which represents an increase of approximately 12 percent over total current operating revenues.

RATE BASE AND OPERATING INCOME

Scope of Investigation

On July 14, 2021, and again on August 11, 2021, the Commission authorized Staff to issue a request for proposal (RFP) to hire a consultant to verify and attest to the Applicant's financial information, review the depreciation study, investigate the cost of service study (COSS) and proposed rates, and audit the functional areas of the Companies' management policies, practices and organization identified in Staff's June 14, 2021 letters filed in the dockets. The selected auditor was required to complete the guideline procedures contained in the RFP and was to complete any additional procedures it considered necessary to complete the review.

On September 8, 2021, the Commission selected Larkin & Associates, PLLC (Larkin) to conduct the review, and the Commission directed Aqua Ohio to enter into a contract with Larkin for the purpose of providing payment for its services. The cost of providing these services is included in Larkin's rate case expense recommendation.

Larkin has completed its investigation and its report has been docketed in this case (Larkin Report).

Revenue Requirements

Schedule A, page 1, in the Larkin Report's Exhibit LA-1 presents the auditor's determination of the Applicant's revenue requirements and revenue increase based on the auditor's examination of the accounts and records of the Applicant for the test year ending December 31, 2021, and date certain of December 31, 2021 and the Staff's rate of return recommendations.

Rate Base

The rate base represents the Applicant's net investment in plant, materials and supplies, and other assets as of the date certain, December 31, 2021, which were used and useful, or projected to be used and useful as of the date certain, in providing water utility service to its customers, and upon which its investors are entitled to the opportunity to receive a fair and reasonable rate of return. The Larkin Report addresses the auditor's analysis and findings related to Plant in Service, Depreciation, Other Rate Base Items, and Allocations. The Staff addresses the Depreciation Study, Construction Work in Progress, and Working Capital. A comparison of the rate base submitted by the Applicant and the auditor's recommendation is shown on Schedule B in Larkin Report's Exhibit LA-1. Schedules B-1 through B-10 provide support for Larkin's recommended adjustments to rate base.

Depreciation Study

The Applicant did not file a depreciation study as part of this application. Staff recommends the Commission direct Aqua Ohio to prepare and file a depreciation study within two years of the Commission Order in this case.

Construction Work in Progress

The Applicant did not request an allowance for construction work in progress in its filing. This is reflected on Applicant's Schedule B-4.

Working Capital

The Applicant did not request a working capital allowance in its filing. This is reflected on Applicant's Schedule B-5.

Operating Income

The Applicant's test year revenues consist of 12 months of historical data for the period of January 1, 2020 through December 31, 2020. The Applicant's test year expenses reflect three months of actual data and nine months of forecasted data. Larkin adjusted the Applicant's test year operating income as required to render it an appropriate basis for setting rates. Larkin's pro forma operating income is its adjusted test year operating income modified to reflect the Applicant's proposed increase in revenues and the associated increases in uncollectible accounts expense, Ohio gross receipts taxes, and federal income taxes. The Applicant's pro forma adjustments are shown on Schedule C-1.

Schedule C presents a summary of Larkin's determination of operating income. The calculations, methodologies, and rationale used to develop Larkin's adjusted and pro forma operating income are summarized on schedule C.1 with operating income adjustments detailed on Schedules C-1 through C-13 in the Larkin Report's Exhibit LA-1.

RATE OF RETURN

The Staff recommends a rate of return in the range of 6.51 percent and 7.04 percent. The recommended rate of return was developed using a cost of capital approach which reflects a market-derived cost of equity and Aqua Ohio's actual cost of debt.

Capital Structure

Aqua Ohio is a wholly owned subsidiary of Essential Utilities, Inc., which is a utility holding company that is publicly traded. Staff used the capital structure of Aqua Ohio which was 47.9 percent debt and 52.1 percent equity according to an update provided by Aqua Ohio as of November 30, 2021.

Cost of Long-Term Debt

Staff used the embedded cost of long-term debt of Aqua Ohio as of November 30, 2021, as shown on the Applicant's updated Schedule D-3. Aqua Ohio's embedded cost of long-term debt is 3.82 percent.

Cost of Equity

Staff used Value Line, Inc.'s (Value Line) Stock Screener tool to compile a list of comparable companies to use as a proxy group for the purpose of calculating a cost of equity estimate. Staff's initial criteria for the Stock Screener was industry type. Value Line provided a group of 12 companies that met the criteria of being a water utility. Staff compiled a Safety Rank², Financial Strength Rating³, and beta⁴ values from Value Line for each of the 12 companies designated as water utilities. However, 5 of the 12 companies did not have ratings and financial information available for Staff's analysis. Therefore, those five companies were removed from the list of possible comparable companies. Value Line classified each of the remaining seven possible comparable companies according to market capitalization. Companies were grouped and identified as either large cap, mid cap, or small cap companies. As Essential Utilities is classified as a large cap company, Staff selected both large cap and mid cap companies to be included in the comparable companies group. Application of the selected criteria resulted in a group of six water utilities. As shown in the table below, in addition to Essential Utilities, Staff selected American Water Works Company, Inc., American States Water Company, California Water Service Group, Middlesex Water Company, and SJW Group to use as the peer group (Peer Group).

² Value Line's Safety Rank measures the total risk of a stock relative to the approximately 1,700 other stocks covered by the Value Line Investment Survey.

³ Value Line classifies 1,700 companies' Financial Strength ratings from A++ to C, in nine steps. The lowest grade is reserved for companies experiencing serious financial difficulty. Balance sheet leverage, business risk, the level and direction of profits, cash flow, earned returns, cash, corporate size, and stock price, all contribute to a company's relative position on the scale. The amount of cash on hand, net of debt, is also an important consideration.

⁴ Beta is a measure of the volatility of a security or portfolio compared to the market.

Company Name	Ticker	Industry	Beta	Safety Rank™	Financial Strength Rating	Market Capitalization (\$ millions)	Notes
Essential Utilities	WTRG	Water Utility	1	3	B+	\$ 11,000	(large cap)
American Water Works	AWK	Water Utility	0.9	3	B++	\$ 28,600	(large cap)
American States Water Co	AWR	Water Utility	0.65	2	A	\$ 3,000	(mid cap)
California Water Service Group	CWT	Water Utility	0.7	3	B++	\$ 2,900	(mid cap)
Middlesex Water Co	MSEX	Water Utility	0.7	2	B++	\$ 1,500	(mid cap)
SJW Group	SJW	Water Utility	0.8	3	B+	\$ 1,900	(mid cap)

Staff employed a cost of equity estimate for the Peer Group that used the capital asset pricing model (CAPM), the discounted cash flow (DCF) model, and a comparable earnings review (CE Review).

Staff used the following formula to calculate the CAPM cost of common equity estimate:

$$\text{CAPM} = \text{Risk-Free Rate} + \text{Beta} * (\text{Equity Risk Premium})$$

In making this calculation, Staff used a composite beta of 0.81, which is an average of the betas sourced from Value Line and Standard and Poor's (S&P) Capital IQ for the Peer Group. In calculating an Equity Risk Premium, Staff used the arithmetic average of annual returns from 1972 through 2020 for large-cap stocks of 12.3 percent less the arithmetic average for the same time period for U.S. Treasury Bills of 4.6 percent.⁵ These inputs resulted in an Equity Risk Premium of 7.7 percent. For a risk-free rate, Staff reviewed yield curve rates for the 20-year and 30-year U.S. Treasury Bonds. Staff used a six-month average of daily yield curve rates from March 1, 2021 through August 31, 2021. The six-month average yield for 20-year and 30-year U.S. Treasury Bonds were 2.07 percent and 2.16 percent, respectively. An average of these two averaged yields resulted in a risk-free rate of 2.12 percent. The factors, as detailed above, produce the following calculation:

$$8.36 = 2.12 + (0.81 * 7.7)^6$$

In calculating its DCF cost of common equity estimate for each company in the Peer Group, Staff used the average stock price, the sum of the last four quarterly dividends, and estimates of the expected growth rate of earnings. The average stock price was determined by averaging the adjusted daily closing price for the period from October 1, 2020 through September 30, 2021. The DCF model assumes that earnings growth and dividends growth are the same. Staff averaged earnings per share growth estimates from Yahoo Finance, Seeking Alpha, CNBC, and Value Line to determine DCF growth estimates for each company in the Peer Group. The Value Line average incorporates both the explicit long-range earnings estimate shown in the boxed area of investor

⁵ Stocks, Bonds, Bills, and Inflation® (SBBI®) 2021 Summary Edition, Exhibit 2.14 at 38.

⁶ See Staff Schedule D-1.3.

sheets and the implicit continuous growth rate calculated from the estimates of earnings per share. For its determination of DCF cost of equity, Staff assumed a non-constant DCF growth rate. Staff assumed dividends grow at a rate derived from financial analysts' growth estimates for the first five years (i.e., long-term growth rate). Staff's DCF growth estimates were used for the first five years, as they are averages of estimates from various investor news services. From the twenty-fifth year on, the growth rate was assumed to equal the long-term growth rate in Gross National Product (GNP). For the sixth through twenty-fourth years, assumed dividend growth rates changed incrementally from the average growth used in the first five years towards the GNP rate in a linear fashion. The long-term growth rate in GNP was the average annual change in GNP from the U.S. Department of Commerce for 1929 through 2020.⁷ Staff calculated a stream of annual dividends based upon each Peer Group company's most recent annual dividend amount and DCF growth estimates along with long-term GNP growth. Staff used the internal rate of return derived from the dividend stream and the stock price for its non-constant growth DCF cost of equity estimate. The Peer Group's non-constant DCF cost of equity estimates average 8.30 percent.⁸

Staff also performed a CE Review. Staff's CE Review focused on returns earned in calendar year 2020 for two groups of companies. Group 1 consisted of companies from various industries where industry type was not a criterion for selection. Group 2 consisted of only utility industries (water, electric, natural gas, and telecom.). Group 1 was generated using Value Line's Stock Screener tool with the following criteria: a Safety™ Rank of 3, a Financial Strength Rating of B+, and a Beta between 0.65 and 1.35. Group 2 was generated using Value Line's Stock Screener tool with the only criteria being categorization within a utility industry. Group 1 consisted of 426 companies that had the same Safety™ Rank and Financial Strength Rating as assigned to Essential Utilities by Value Line. Group 1 experienced an average return on shareholders' equity (ROE) of 13.53 percent. Group 2 consisted of 68 companies that are categorized as utility companies. Group 2 experienced an average ROE of 9.49 percent. Averaging the two results together results in a composite average of 11.51 percent.⁹

ROE Summary

CAPM	8.36%
DCF	8.30%
CE Review	11.51%
Combined Average	9.39%

Staff averaged the results of calculations of the CAPM, DCF and the CE Review to arrive at a cost of equity estimate of 9.39 percent. When applying a one-hundred basis point range of uncertainty, the cost of equity estimate becomes 8.89 percent to 9.89 percent. To provide for this return, an allowance must be made for issuance and other costs, as shown on Staff Schedule D-1.2. Therefore, an adjustment factor of 1.01145

⁷ See Staff Schedule D-1.11

⁸ See Staff Schedule D-1.4

⁹ See Staff Schedule D-1.12

was applied resulting in a baseline cost of common equity recommendation of 8.99 percent to 10.00 percent, as shown on Staff's Schedule D-1.1.

RATES AND TARIFFS

Introduction

Aqua Ohio requests authority to increase its rates and charges for general water service to all classes of customers within its Lake Erie and Masury divisions and those customers formerly served by OAW, Mohawk, Tomahawk, Firestone Trace, and Southwoods Estates. Further, the Applicant's proposed rate structure would consolidate rates into three proposed rate groups:

- Rate Group 1: service to customers in the Lake Erie and customers formerly served by Tomahawk and Firestone Trace;
- Rate group 2: service to customers in Masury, Seneca, Norlick, Auburn Lakes, and Lake Erie East and customers formerly served by Mohawk;
- Rate Group 3: customers formerly served by OAW and Southwoods Estates.

Tariff Analysis

Staff reviewed the tariff terms and conditions and bill format. Staff has no recommendations.

Larkin subcontracted with Acadian Consulting Group (ACG) to review the rates and tariff matters proposed by the Applicant and analyze the acceptability and reasonableness of the revenue recovery mechanisms contained in the application, including an examination of the Applicant's cost of service study to determine whether it is an appropriate basis for calculating the revenue responsibility of each class. The Larkin Report includes ACG's recommendations on the rates and tariff matters proposed by the Applicant.

SERVICE MONITORING AND ENFORCEMENT

Customer Service

Customer Service Audit

Staff completed a customer service audit in October 2021 to assess the customer service performance, practices, and procedures of the Applicant. As a result of the audit, the Staff determined that the overall customer service practices and policies of the Applicant, as reviewed and observed by the team, comply with the applicable rules and regulations set forth by the Commission.

Customer Contact Assessment

Staff reviewed customer contacts to the PUCO's call center for the period of January 1, 2020 through December 31, 2020, which included 167 contacts. Of these contacts, forty-nine of these contacts were concerning billing matters. Forty-two of the contacts were from customers who had not yet contacted Aqua about the matter at hand. The remainder of the contacts were made up of payment arrangements, a leak, water pressure, and other miscellaneous issues.

Facilities and Operations Review

The Staff of the Facility and Operations Field Division (FOFD) of the PUCO investigated the Company's water and wastewater systems' physical facilities and administrative operations to assess compliance with Ohio Adm.Code 4901:1-15, Standards for Waterworks Companies and Sewage Disposal System Companies. The investigation entailed a review of plant operating records, water quality tests, maintenance and operational concerns, and quarterly operating reports. Due to low response rate of the customer perception surveys, less than five percent in some cases, staff omitted the customer perception survey as part of this evaluation. Based on observations during routine site visits and a review of required compliance documents, Aqua Ohio is a well-managed water utility that provides quality water utility services to customers in a safe a reliable manner.

Unaccounted-for Water Reduction and Reporting

Ohio Adm.Code 4901:1-15-14(H) requires water utilities to provide quarterly operating reports for each of its systems which are to contain, among other items, operating and performance data. Ohio Adm.Code 4901:1-15-20(C)(5) further specifies that the utilities are to determine and report the amount of "unaccounted-for water" (UFW), typically presented as a percentage of total water production, and report this to the commission. Unaccounted-for water (UFW) is the difference between the quantity of water supplied to the system and the metered quantity of water used by the customers. A remedial action plan including an assessment of the cost-benefit of a leak study is required to be submitted with the quarterly operations report when a system's UFW exceeds 15 percent. The rule was revised in 2012 so that a remedial action plan will include annual "Infrastructure Leak Index" (ILI) calculations when a system has over 3,000 customers. Companies are considered to be compliant if actual ILI does not exceed the target ILI

established in Case No. 16-0907-WW-AIR, (Staff Report, Table FOFD No. 2 on page 32).

UFW has two components: (a) physical losses due to leakage from pipes, and (b) administrative losses due to illegal connections and under-registration of water meters; both components contribute to UFW. The reduction of UFW is a way to improve the financial health of the water utility. UFW in well-run utilities is generally 15-20%, although the optimal level will vary depending on circumstances. The percentage of water loss is influenced not only by the deterioration of the piped network, but also by the total amount of water used, system pressure, and the degree of supply continuity. The percentage of administrative losses depends on the degree of effort exerted in identifying illegal connections and in repairing meters. If the UFW is equal to or greater than fifteen percent of the gross production, the utilities are required to submit a remedial action report that includes an assessment of the cost benefit of a leak study. Aqua Ohio has complied with the reporting requirements.

UFW in Aqua Ohio's Small Water Systems

Table 1 on the following page summarizes UFW for small public water systems in rate case 21-0595-WW-AIR; these systems had less than 3,000 service connections from 12/31/2017 to 12/31/2020. Any negative UFW values resulted from an offset between metered usage and the date when the customer is billed; this offset can be as much as 3-4 months.

Table 1. UFW in Aqua Ohio Small Water Systems

DIVISION	WATER SYSTEM	As of	As of	As of	As of	See Note
		12/31/2017 UFW (%)	12/31/2018 UFW (%)	12/31/2019 UFW (%)	12/31/2020 UFW (%)	
Franklin, Lawrence, Preble & Lake White	Blacklick	17.0%	30.0%	25.5%	22.2%	7
Franklin, Lawrence, Preble & Lake White	Huber Ridge	19.8%	28.5%	25.2%	17.5%	4
Franklin, Lawrence, Preble & Lake White	Lake Darby	21.7%	28.0%	16.0%	6.9%	
Franklin, Lawrence, Preble & Lake White	Timberbrook	7.7%	14.2%	11.3%	11.4%	
Franklin, Lawrence, Preble & Lake White	Worthington Hills	1.1%	8.5%	14.0%	13.3%	
Franklin, Lawrence, Preble & Lake White	Preble County	-	-	-	-	1
Franklin, Lawrence, Preble & Lake White	Lake White	15.9%	18.2%	28.4%	20.4%	4
Franklin, Lawrence, Preble & Lake White	Lawrence County	18.7%	15.4%	19.6%	12.8%	7
Marion / Tiffin	Marion	18.4%	19.6%	15.7%	17.8%	7
Marion / Tiffin	Tiffin	14.5%	9.6%	19.6%	15.6%	7
Ashtabula	Ashtabula	13.5%	18.5%	12.9%	19.0%	7
Ashtabula	Jefferson Village	14.6%	10.9%	9.0%	12.6%	
Mentor / Ashtabula	Mentor	10.7%	7.1%	11.9%	11.1%	7
Mentor / Ashtabula	Auburn Lake	10.0%	10.0%	10.0%	10.0%	2
Mentor / Ashtabula	Norlick	7.0%	6.3%	3.0%	6.2%	
Mentor / Ashtabula	Seneca Lake	10.0%	10.0%	10.0%	10.0%	2
Mentor / Ashtabula	Shepard Hills	12.9%	11.6%	9.4%	8.1%	
Stark, Mansfield, & Portage County	Mansfield #1 (Madison)	4.1%	8.8%	21.6%	23.0%	6,4
Stark, Mansfield, & Portage County	Mansfield #2 (Imperial Est #2 - Biscayne)	1.3%	2.7%	4.8%	6.4%	6
Stark, Mansfield, & Portage County	Mansfield #3 (Imperial Est #2 - Bryonaire)	17.0%	28.1%	7.7%	-8.7%	6
Stark, Mansfield, & Portage County	Mansfield #4 (Hallabrin)	19.7%	5.3%	11.5%	5.4%	6
Stark, Mansfield, & Portage County	Mansfield #5 (Walcrest)	3.2%	5.5%	-7.7%	-9.6%	6
Stark, Mansfield, & Portage County	Mansfield #6 (Greenridge)	6.2%	3.0%	5.1%	7.2%	6
Stark, Mansfield, & Portage County	Mansfield #7 (Harpcrest)	4.9%	13.3%	31.9%	23.4%	6,4
Stark, Mansfield, & Portage County	Mansfield #8 (Mohican or Wolf Road)	2.3%	6.2%	4.9%	4.0%	6
Stark, Mansfield, & Portage County	Mansfield #9 (Little Valley)	3.1%	8.6%	6.4%	9.1%	6
Stark, Mansfield, & Portage County	Mansfield #10 (Ford Road)	12.4%	4.8%	-2.0%	-3.0%	6
Stark, Mansfield, & Portage County	Mansfield #11 (Sites Lake)	18.7%	12.5%	8.6%	8.5%	6
Stark, Mansfield, & Portage County	Mohawk	12.2%	11.8%	13.7%	17.6%	4
Stark, Mansfield, & Portage County	Portage County - Aurora East	22.5%	24.9%	3.6%	2.8%	3
Stark, Mansfield, & Portage County	Portage County - Beechcrest	2.7%	-3.8%	-5.1%	-2.0%	3
Stark, Mansfield, & Portage County	Firestone Trace	Not AOH	11.0%	-11.0%	-8.0%	1
Stark, Mansfield, & Portage County	Southwoods Estates	Not AOH	Not AOH	Not AOH	17.2%	1
Struthers	Masury	16.4%	22.4%	17.6%	20.6%	5
Struthers	Tomahawk	10.0%	10.0%	10.0%	15.8%	2

Notes: (1) No Quarterly PUCO Report File; (2) No data to compare system delivery to consumption, assume 10% per PUCO; (3) These 2 PWS roll up into "Portage County", -5% on Schedule B-8; (4) Economic Evaluation of Leak Program; (5) PUCO requires Shenango UFW to be reported, not Masury; (6) These 11 PWS roll up into "Mansfield" 13.0% on Schedule B-8; (7) ILI Supersedes % UFW

Economic Levels of Leakage

An Economic Level of Leakage (ELL) analysis is used by water utilities to develop a leakage management program (or water loss control plan) by helping identify what loss control measures can realize a benefit relative to their costs. An ELL analysis identifies the amount of leakage that can be avoided through control measures whose costs are balanced against the savings of reduced leakage.

Four activities drive the ELL for a public water system: pressure management, speed and quality of repairs, water main rehabilitation, and active leak control. Of these, pressure management is the most cost-effective activity in achieving ELL; this practice has been implemented as an ongoing best management practice at Aqua Ohio. In addition, the speed and quality of repairs for reported leaks is instituted as a best management practice in several Aqua Ohio policies:

- a. Repair surfacing leaks impacting customer service within 24 hours of becoming aware of the leak and locating the leak.
- b. Repair surfacing leaks not impacting customer service within five business days of becoming aware of the leak and locating the leak.
- c. Repair all reported non-surfacing leaks not impacting customer service within 30 days of becoming aware and locating the leak.
- d. All non-surfacing leaks that are unreported but identified during leak surveys are enter into Aqua Ohio's maintenance software or tracked on a spreadsheet for tracking of repairs and calculation of cost-benefit ratio.

Findings

As of December 31, 2020, Aqua Ohio water systems with UFW greater than 15% with less than 3,000 service connections were as follows: (a) Huber Ridge, (b) Lake White, (c) Mohawk, (d) Mansfield #1, (e) Mansfield #7, (f) Masury, (g) Southwoods Estates, and (h) Tomahawk. Because the UFW exceeded 15% in the above systems, an ELL analysis was conducted for each, which is depicted on the following page in Table 2. The cost of leak repair is not included in these ELL analyses. Masury is not included in the analysis because Masury is based on Aqua-Shenango, Pennsylvania, public water system water loss per PUCO Staff direction.

These cost-benefit analyses show that the cost of locating the water loss in excess of 15% would be more than the value of the water potentially recovered in these systems. Therefore, ELL analyses provide evidence that from a cost-benefit perspective, it is not always in the best interests of the water company, customers, and stakeholders to implement a leak detection plan, unless the benefits of implementing such a program outweigh the projected costs.

Recommendation

Staff recommends the Applicant continue efforts to reduce in the aforementioned systems with a UFW greater than 15% by continuing to focus on pressure management, the speed and quality of repairs, water main rehabilitation, and implement active leak detection plan when cost-benefit analyses support the decision.

UFW in Aqua Ohio Large Water Systems

Table 2 on the following page shows the calculated ILI's for systems for systems with an average customer count over 3,000 from 2017 and 2020. It also shows target ILI's as stipulated in the prior rate case and revised targets proposed by the Staff based on the most recent data and further review of ILI standards in the American Water Works Association's M36, 3rd Edition.

Table 2. Cost-Benefit Analysis of Leak Control in Aqua Ohio Small System with UFW Exceeding 15%

COST OF LOST WATER	Huber Ridge	Lake White	Mohawk	MS #1	MS #7	Masury	Southwoods	Tomahawk
Number of Total Service Connections	2,310	439	974	352	314	-	21	284
Trailing 12 month UFW	17.5%	20.4%	17.6%	23.0%	23.4%	-	17.2%	15.8%
Total Authorized & UFA for Year (gallons)	139,866,000	20,404,000	39,547,000	14,777,390	17,184,910	-	2,442,000	12,120,000
% Desired recovery (Lost water above 15%)	2.5%	5.4%	2.6%	8.0%	8.4%	-	2.2%	1%
Gallons Desired Recovery	3,496,650	1,101,816	1,028,222	1,182,191	1,443,532	-	53,724	96,960
Leak Rate - gallons per minute	6.7	2.1	2.0	2.2	2.7	-	0.1	0.2
Gallons per day per connection loss	4.15	7	3	9.20	12.60	-	7.01	0.94
Leak Rate - gpm per connection	0.0029	0.005	0.0020	0.0064	0.0087	-	0.0049	0.0006
Detection Level Limit - gpm	0.01	0.01	0.01	0.01	0.01	-	0.01	0.01
Cost of chemicals /1000 gallons	\$ 0.500	-	\$ 0.400	\$0.400	\$0.400	-	\$0.400	\$0.400
Cost of electric/1000 gallons	\$ 0.320	\$0.230	\$0.320	\$0.320	\$0.320	-	\$0.320	\$0.320
Purchased water (gallons)	-	20,404,000	-	-	-	-	-	-
Total Cost of purchased water	-	\$60,191.80	-	-	-	-	-	-
Cost of purchased water/1000 gallons	-	\$2.95	-	-	-	-	-	-
Cost of lost water above 15%	\$ 2,867.25	\$3,503.77	\$740.32	\$851.18	\$1,039.34	-	\$38.68	\$69.81
COST OF LEAK DETECTION								
Miles of pipe to be checked	23.8	13.6	23.2	3.8	4.0	-	0.8	11.9
Miles of pipe per day detected	2	2	2	2	2	-	2	2
Total days	12	7	12	2	2	-	0	6
Cost per Day for leak detection (labor)	\$424.00	\$424.00	\$424.00	\$424.00	\$424.00	-	\$424.00	\$424.00
Mobilization cost	\$1,000.00	\$1,000.00	\$1,000.00	\$1,000.00	\$1,000.00	-	\$1,000.00	\$1,000.00
Total Leak Detection Estimated Cost	\$6,045.60	\$3,883.20	\$5,918.40	\$1,805.60	\$1,848.00	-	\$1,169.60	\$3,522.80

Table 3 summarizes the Infrastructure Leak Index (ILI) data based on a 12-month rolling average for Aqua Ohio public water systems with 3,000 or more service connections:

Table 3. ILI of Aqua Ohio Large Water Systems

PWS	Average Customer Count	2017 ILI	2018 ILI	2019 ILI	2020 ILI	ILI Targets*
Ashtabula	12,435	2.65	2.82	2.29	2.49	3.7
Blacklick	3,000	1.81	4.23	3.17	2.81	3.7**
Lawrence Co.	3,280	2.06	1.62	2.05	1.20	3.0
Marion	18,170	3.19	3.03	2.47	2.56	3.5
Mentor	30,436	1.06	.79	1.06	0.95	3.5
Tiffin	7,953	2.14	1.20	1.94	2.30	3.0

* ILI Targets established in Staff Report Rate Case No. 16-0907-WW-AIR; page 32. The ILI targets were based on American Water Works Association M36 3rd Edition, pp.110-113.

** No ILI Target was established for Blacklick because it did not qualify under the ILI criteria when the 2016 ILI targets were established; a 3.7 ILI Target for Blacklick is proposed.

Findings

All Aqua Ohio systems with 3,000 or more service connections met PUCO the ILI Targets established during Case No. 16-907-WW-AIR. In 2021, the Blacklick water system surpassed the 3,000 population threshold requiring an ILI to be reported annually.

Recommendation

Staff recommends Aqua Ohio continue filing ILI reports annually by the end of February of the following year for the five systems identified in this case as having more than 3,000 customers. The Applicant's actual ILI's were under target ILI's from 2017-2020. Staff recommends maintaining the existing ILI targets with no changes. Staff recommends adding Blacklick to the list of systems filing an annual ILI report to be used in future rate cases. Staff recommends approving the proposed 3.7 ILI target for the Blacklick system.

Masury UFW

In the past, the PUCO required Aqua Ohio to calculate the UFW for Masury using meter readings taken from its water supplier, the Aqua-Shenango Valley system across the Pennsylvania border. At the time, this was the best method for calculating UFW given that Masury did not have meters installed in the system and could not accurately calculate UFW.

Findings

Aqua Ohio has installed meters in the Masury system and now has the capability to calculate UFW independent of the Aqua-Shenango Valley system. Aqua Ohio does not know what the true Masury UFW is because it has never been calculated using meter readings taken from the newly installed meters.

Recommendation

Staff recommends that meter readings taken from the Aqua-Shenango Valley system should no longer be used to calculate the UFW value for the Masury system. Moving forward, Staff recommends Aqua Ohio use meter readings taken exclusively from the Masury system to calculate UFW.

Major Capital Projects since Case No. 16-0907-WW-AIR

Approximately 162,000 lineal feet of water main was replaced between 2017 and 2020. In addition, another 36,360 ft was projected to be replaced 2021, for a total of 198,360 ft or 37.6 miles. Other improvements since Case No. 16-0907-WW-AIR, include the following:

1. **Ashtabula** - New primary treatment plant under construction is designed to include rapid mix, flocculation, and sedimentation treatment processes; two new filters for a total of eight; clearwell converted to a contact tank; new “vestibule” building constructed to house rebuilt filters.
2. **Auburn Lakes** - Two new Schneider magnetic flow meters installed, one each for raw and finished water.
3. **Franklin County** -
 - a. **Blacklick** – new SCADA system installed, two newer variable frequency drives, new roof constructed.
 - b. **Huber Ridge** – new Franklin County main office building and water testing laboratory constructed, valves for gravity filters replaced, one new reverse osmosis treatment train replaced.
 - c. **Lake Darby** – new reverse osmosis membrane filters under construction, new SCADA system with associated control panel installed, old softeners and aeralater removed from plant, a temporary clearwell is under construction.
 - d. **Timberbrook** – new SCADA system installed, new roof constructed.

- e. **Worthington** – new SCADA system installed, three variable frequency drives installed, two new booster pumps with associated control panel installed.

- 4. **Masury** - installed new control circuit board for the emergency generator at the Lincoln booster station.

- 5. **Marion** – backwash holding tank constructed, new Tri-River water storage tower built.

- 6. **Mentor** – #2 and #6 variable flow devices replaced for high service pumps.

- 7. **Shepherd Hills** - new clearwell constructed.

- 8. **Tiffin** - new baffles installed in tanks to replace wood baffles, exterior tanks repainted, new gangplank grating installed around exterior basins.

- 9. **Tomahawk** - four new filters installed, new clearwell constructed next to plant, water tower repainted.

MANAGEMENT AND OPERATIONS REVIEW

Introduction

Ohio R.C. 4909.154 states that the Commission shall consider the management policies, practices, and organization of public utilities in fixing the just, reasonable, and compensatory rates, joint rates, tolls, classification, charges or rentals to be observed and charged for service of any public utility. As part of the supplemental filing requirements (SFR) for an application for an increase in rates, Ohio Adm.Code 4901-7-01, App. A, Ch. II (B)(9) requires the applicant utility to provide an executive summary of the management policies, practices, and organization used to meet corporate goals, as defined by the board of directors and corporate officers. The applicant utility is also required to demonstrate how pertinent elements of the management process relate to three functional areas, which are identified and requested by the Staff. On June 14, 2021, Staff notified the Applicant that the following areas were selected:

1. Financial planning process and objectives, including the policies and procedures for Aqua Ohio's capital planning and financing activities, and how Aqua Ohio's capital needs are supported by Essential's central treasury department.
2. Legal, including the policies and procedures for Aqua Ohio's lobbying and political activities and how those fit in with the more comprehensive compliance program established by Essential.
3. Budgeting and forecasting, including policies and procedures for how costs are allocated to Aqua Ohio from Essential.

Management and Operations Review

Larkin reviewed the functional areas of Aqua Ohio's management policies, practices and organization identified in Staff's June 14, 2021 letters filed in rate case docket. The Larkin Report includes a summary of their investigation and recommendations.

The Public Utilities Commission of Ohio
Jenifer French, Chair

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PUCO Staff