STATE OF NORTH CAROLINA
UTILITIES COMMISSION
RALEIGH

DOCKET NO. W-218, SUB 526A

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

In the Matter of Reporting Requirements from Docket No. W-218, Sub 526 – Applications by Aqua North Carolina, Inc., 202 MacKenan Court, Cary, North Carolina 27511, for Approval to Implement Secondary Water Quality System Improvement Projects Pursuant to N.C. Gen. Stat. § 62-133.12	)	PUBLIC STAFF SECONDARY WATER QUALITY REPORT AND RECOMMENDATIONS

NOW COMES THE PUBLIC STAFF – North Carolina Utilities Commission by and through its Executive Director, Christopher J. Ayers, and respectfully submits its Report and Recommendations as to Aqua North Carolina, Inc.'s (Aqua) April 14, May 17, July 2, August 5, and August 20, 2021, Applications for Approval to Implement Secondary Water Quality System Improvement Projects Pursuant to N.C. Gen. Stat. § 62-133.12 (Applications), which are scheduled for Commission consideration at the Commission's September 7, 2021, Regular Staff Conference.

A. Executive Summary

The Public Staff has thoroughly reviewed the six filter projects proposed by Aqua in its Applications. The Public Staff's review included, but was not limited to, Aqua's Executive Summary packets and Aqua's responses to an extensive list of information requested by the Public Staff in a document titled Review of Potential Filtration Systems and Semi-Annual Reports to Commission – Secondary Water Quality Concerns Public Staff Required Review Documents and Information and

attached as Exhibit 1. Aqua provided the requested information for the proposed filter projects. The Public Staff has on several occasions communicated and met with customers and Aqua personnel pertaining to secondary water quality issues.

Based upon its review of the documents, site visits, and/or discussions with customers and Aqua's engineers and operations managers, the Public Staff recommends that the Commission approve the proposed projects which address secondary water quality standards.

Summary of Filtration Projects

System	County	Approved Pumping Capacity Gallons Per Minute	Aqua Estimated Cost 000's
Spring Shores Well 2	Iredell	50	$272-$297
Martindale Well 3	Wake	60	$325-$350
Carden's Creek Wells 1 and 2	Durham	56	$470-$495
Bayleaf Farms Well 1	Wake	117	$330-$355
Royal Senter Ridge Well 1	Wake	68	$390-$415[1]
Royal Senter Ridge Wells 2 and 3	Wake	128	$370-$395
		Total	$2.157-$2.307 Million

B. Additional Measures to Improve Secondary Water Quality

In general, the Public Staff strongly supports the implementation of two secondary water quality processes: (1) a comprehensive customer education

[1] In a discovery response provided to the Public Staff on March 23, 2021, the Company estimated the interconnection of the Branston and Royal Senter Ridge distribution systems and separate filtration at Royal Senter Ridge Well 1 and Royal Senter Ridge Wells 2 and 3 would cost an estimated $680,000.

program and (2) a comprehensive water main flushing program. These processes have been discussed by the Public Staff in previous reports.[2]

In its Applications at paragraph 10, Aqua discusses a four-step protocol for selecting measures to improve secondary water quality, beginning with least cost options and progressing to options that are more expensive. The first option is cleaning of the hydropneumatic tank and flushing of the system. The second option is evaluation and, if expected to be effective, initiation of treatment with a sequestering agent. The third option, installation of a disposable cartridge filter on the well, is a treatment process initiated by Aqua for its water wells. Based on its growing experience with these types of filters on community water system wells, the Public Staff agrees that they are far less expensive than manganese greensand type filters. The Public Staff and Aqua will continue to monitor both the treatment effectiveness and cost effectiveness of these particulate cartridge filters.

Aqua installed particulate cartridge filters at Spring Shores Well 2 in 2016, Martindale Well 3 in August 2017, Carden's Creek Wells 1 and 2 in May 2018, and Royal Senter Ridge Well 1 in 2015. The disposable cartridge filters did not effectively and efficiently remove the iron and manganese particles to acceptable concentration levels. Based on the individual system conditions, including but not limited to customer demand, well production, water quality, and customer feedback, it is appropriate to undertake the next step of Aqua's protocol for selecting measures to improve secondary water quality. In its Applications at

[2] For a summary of the Public Staff's position on comprehensive customer education and water main flushing programs, please see the Public Staff Secondary Water Quality Report and Recommendations filed in Docket No. W-218, Sub 526A on March 8, 2021.

paragraph 11, Aqua mentions "the need to accelerate the secondary water quality treatment protocols . . . in some instances." The Public Staff agrees that Bayleaf Farms Well 1 and Royal Senter Ridge Wells 2 and 3 are instances in which it is reasonable to skip step three, installation of disposable cartridge filtration, and proceed directly to step four, installation of an iron and manganese filtration system.

C. Public Staff Filtration Recommendations

The Public Staff recommends that the Commission approve Aqua's six proposed secondary standard water quality projects. For each of these filter projects where Aqua plans to use a filter system such as manganese dioxide, the Public Staff believes the filters are necessary to provide adequate secondary standard water quality.

The Public Staff has observed that the sequestration treatment of iron and manganese with polyphosphates and orthophosphates on water from North Carolina water wells has been successful since the late 1970s for both Heater Utilities, Inc. and Carolina Water Service, Inc. of North Carolina. Sequestration, coupled with comprehensive water main flushing programs, has provided adequate secondary standard water quality on many water systems at a very reasonable cost. The installation of filters such as manganese greensand is many times more costly than sequestration coupled with adequate flushing, considering the filters' depreciation, return on rate base, debt cost, and backwash disposal costs.

In its Applications at paragraph 9[3] and at the end of Appendix A, Aqua indicates when the Company plans to make the capital investments and complete the projects in the water systems. The table below shows the dates the Public Staff notified the Company of its concurrence with the final proposed projects, the dates the Company applied for Commission approval, and the dates the filter projects are estimated to be completed.

Filter Project Timelines

System	PS Notice	Application	Estimated Completion
Spring Shores Well 2	3/25/2021	4/14/2021	September 2022
Martindale Well 3	4/15/2021	5/17/2021	September 2022
Carden's Creek Wells 1 and 2	5/27/2021	7/2/2021	December 2021
Bayleaf Farms Well 1	7/27/2021	8/5/2021	September 2022
Royal Senter Ridge Well 1	4/30/2021	8/5/2021	September 2021[4]
Royal Senter Ridge Wells 2 and 3	8/13/2021	8/20/2021	September 2021[5]

Aqua has estimated that the applied for filter projects will cost a total of $2,157,000 to $2,307,000. The annual revenue requirement increase for the minimum capital expenditure of $2,157,000 for these six filtration systems is approximately $263,986 compared to the annual revenue requirement for the chemical cost for sequestration of approximately $1,768. Given the significant

[3] Paragraph 9 indicates the date by which the Company plans to make the collective investment if there is more than one project, which is the latter of the estimated completion dates of the projects.

[4] In its WSIC/SSIC Construction Status Report for the Second Quarter of 2021 (Construction Status Report) filed on August 16, 2021, in Docket No. W-218, Sub 526A, the Company states the estimated completion date is December 31, 2021.

[5] In its Construction Status Report, the Company states the estimated completion date is December 31, 2021.

revenue requirement impact, the decisions to install manganese greensand type filters should be made judiciously.

The Public Staff believes that the continued use of polyphosphates and/or orthophosphates, and/or SeaQuest as sequestrants, is a very economical treatment process for iron and manganese secondary water issues and for hardness, which does not have a secondary water quality standard. The process of testing whether the iron and manganese is soluble (clear liquid) or insoluble (solid particles and visible) in raw untreated water at the well head, after treatment with polyphosphate/orthophosphate or SeaQuest at the entry point, and in the distribution system, has been continuously used since the late 1970s by the North Carolina Department of Environmental Quality, Public Water Supply Section, and Commission regulated water utilities. The Public Staff believes the soluble and insoluble testing provides extremely valuable information to assist in evaluations of whether filtration is necessary.

The Public Staff strongly believes that the most cost effective way to treat iron and manganese in drinking water is a comprehensive distribution system flushing program, periodic cleaning of the hydropneumatic tanks, use of the appropriate sequestrant, and a reasonable customer education program to advise customers to avoid chlorine bleaches, flush water heaters periodically according to the manufacturers' recommendations, and maintain lower temperatures on water heaters. These measures are exponentially less expensive than the installation of an iron and manganese filtration system. The Public Staff recognizes that, for secondary water quality issues of considerable magnitude and

consistency, sequestration treatment and flushing may not be effective and filtration may be necessary.

The Public Staff will continue to carefully and thoroughly review secondary water quality information and documentation presented by Aqua, including participating in meetings with Aqua engineers and operations managers, conduct selected site visits, discuss secondary water quality issues with customers, and, when appropriate, recommend Commission approval of equipment and infrastructure installations.

Respectfully submitted this the 30th day of August, 2021.

PUBLIC STAFF
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Electronically submitted
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CERTIFICATE OF SERVICE

I, Megan Jost, hereby certify that I have served the foregoing Public Staff Secondary Water Quality Report and Recommendations on all parties of record in accordance with Commission Rule R1-39, by United States mail, postage prepaid, first class; by hand delivery; or by means of facsimile or electronic delivery upon agreement with the receiving party..

This the 30th day of August, 2021.

Electronically submitted
/s/ Megan Jost

Review of Potential Filtration Systems and Semi-Annual Reports to Commission – Secondary Water Quality Concerns
Public Staff Required
Review Documents & Information

1. Total number of current customers on system

2. Estimated total number of customers at buildout

3. a. List of DEH/PWSS approved wells on system

   b. List of active wells on system

4. Simple map of system showing the location of each well, with wells identified

5. DEH/PWSS approval letter for each well

6. Original inorganic analysis for each well submitted to DEH for well approval

7. All inorganic analyses from each well at the wellhead for the last 6 years

8. a. Description of water treatment at each well the past 3 years including specific names of chemicals and dates of changes

   b. Planned changes (if any) on chemical treatment within the next 6 months

9. Copies of all iron and/or manganese analyses for soluble and insoluble the past 3 years – baseline (without treatment), well head (after treatment), distribution system (after treatment)

10. Copies of the Pump Status Report for each well for the last 2 years

11. Original 24 hour pump test for each well

12. a. List of system flushing the past 10 years (include the month, dates and year)

    b. Planned system flushings the next 12 months

13. a. Total number and a list of all customer water quality complaints the past 6 months and past 12 months

    b. Copies of each completed water quality complaint work order the past 12 months.

    c. For the past 6 months do the customer secondary water quality complaints exceed 10% of active customers?

14. Copies within the last 6 months of all Aqua NC emails to and from PWSS, letters to and from PWSS, and reports to and from PWSS, and the recommendations of PWSS regarding water quality concerns on Aqua NC's water systems

15. Planned filter system if any, and briefly describe Aqua's past history with this type filter including effectiveness of treatment

16. Estimated cost of filtration system including backwash

17. Estimated annual operating expense of backwash disposal

18. Size and location of each hydropneumatic water storage tank

19. Year the interior of hydropneumatic storage tank was cleaned through physical access to the interior

Note (1): Once Aqua NC provides to the Public Staff's items 1 through 8, 11, 12a, 15, and 16, then for subsequent 6 month secondary water quality reports to the Commission, Aqua NC need only provide any changes within the past 6 months

Note (2): For large systems such as the Bayleaf Master system with more than 100 wells, where the current water quality complaints are from Sutton Estates, Aqua should only provide information on the wells within Sutton Estates plus any nearby wells that primarily supply Sutton