STATE OF NEW HAMPSHIRE

BEFORE THE

PUBLIC UTILITIES COMMISSION

AQUARION WATER COMPANY OF NEW HAMPSHIRE
DOCKET NO. DW 20-184

DIRECT TESTIMONY
OF
CARL MCMORRAN

December 18, 2020

I. INTRODUCTION AND OVERVIEW OF TESTIMONY

Q. Mr. McMorran, please state your name and business address.

A. My name is Carl McMorran, and my business address is 7 Scott Road, Hampton, New Hampshire 03842.

Q. By whom are you employed and in what capacity?

A. I am the Operations Manager for Aquarion Water Company of New Hampshire, Inc. ("Aquarion" or the "Company").

Q. Please describe your educational background.

A. I have a Bachelor's Degree in Biology from Bucknell University and a Master of Environmental Science Degree from Miami University. I have also taken graduate level courses in business administration, and attended and presented at many water works seminars and conferences.

Q. Please describe your business/professional background.

A. I have worked for Aquarion Water Company of New Hampshire, Inc. ("Aquarion" or the "Company") since November 2008. As Operations Manager, I oversee operations, maintenance, capital improvement and administrative activities for the Company.

From April 1999 through October 2008, I served as Production Manager for the Struthers Division of Aqua Ohio. I supervised a 6 million gallon per day ("MGD") surface water treatment plant, was responsible for source water protection and reservoir management activities, and oversaw operations and maintenance for major distribution facilities (tanks, boosters, etc.). I also had interim supervisory duties at other Aqua Ohio production facilities and acted as operations consultant for the City of Campbell (Ohio) water system.

From August 1990 through March 1999, I served as Water Quality / Technical Services Manager for the Bangor (Maine) Water District. I supervised source water protection and watershed management activities, the water quality laboratory, regulatory compliance, cross connection, and metering and service activities.

From June 1982 through July 1990, I worked as an Environmental Protection Specialist for the Susquehanna River Basin Commission, which regulates water resources in Maryland, New York and Pennsylvania. I conducted water quality assessment surveys, water pollution control and hydropower regulation activities.

I currently hold Class IV Water Treatment and Distribution licenses in New Hampshire and Maine. I previously held a Class IV Water System license in Ohio and a Class A Water System license in Pennsylvania. I also held a Lake Manager certification from the North American Lake Management Society from 1995 through 2008.

I am a member of the American Water Works Association, the New England Water Works Association, and the New Hampshire Water Works Association (NHWWA). I have served on the NHWWA Board of Directors since 2014 and as President in 2020.

Q. Have you previously testified before the New Hampshire Public Utilities Commission (the "Commission")?

A. Yes, I provided live testimony before the Commission in Docket No. DW 12-085, written pre-filed testimony in Docket Nos. DW 10-293 and DW 11-238, and in other dockets relating to the Company's water infrastructure and conservation adjustment ("WICA"), Eversource, and Wiggin Way filings.

Q. What is the purpose of your testimony in this proceeding?

A. My testimony will provide an overview of the Company's water system operations; discuss the Company's cost optimization efforts; discuss rescinding the Eligible Well monitoring requirements from Docket No. DE 97-226; discuss some of the major infrastructure improvements since the Company's last rate case, Docket No. DW 12-085 (particularly the Mill Road Water Treatment Plant, Well 22 and the Little River Water Treatment Plant, and Fixed Base Leak Loggers); and discuss the Company's activities and plans related to PFAS.

Water main replacements, including WICA investments, and other major capital projects are discussed in Dan Lawrence's pre-filed testimony.

II. OVERVIEW OF THE COMPANY'S SYSTEM

Q. Please provide an overview of Aquarion Water Company of New Hampshire.

A. Aquarion Water Company of New Hampshire, Inc. was incorporated in 1889 as Hampton Water Company, and first provided water service in July 1907. Since that time, the Company has grown and currently provides water service to an area of approximately 31 square miles in the Towns of Hampton and North Hampton, and in the Rye Beach and Jenness Beach Precincts in the Town of Rye.

The Company's water system functions to provide safe and reliable water service to residents and businesses in the service territory. Safe water is water of sufficient quality to meet State and Federal Safe Drinking Water standards and is achieved through source protection measures, water treatment processes (disinfection and corrosion control), and water quality monitoring. Reliability refers to the water system's ability to meet domestic, business and fire protection expectations for flow rates, volumes and pressures with a minimum of unplanned interruptions.

The Company's water system is operationally and hydraulically integrated to serve all three towns as a single system.

As of December 31, 2019, there were 140.6 miles of transmission and distribution water mains in the system. The Company owns most of the land on which its structures are located. However, some source of supply land is leased (Wells 10, 14 and 16). The Company's distribution center and office are also leased in Hampton.

The water supply for the Company is obtained from 17 wells; ten overburden wells (Wells 5A, 6, 7, 8A, 9, 10, 11, 12, 14 and 16) and seven bedrock wells (Wells 13B, 17, 18, 19, 20, 21 and 22) (see Attachment CM-1 for a schematic of the system showing the sources of supply). Rated maximum production capacity for the Company's sources of supply at present is 4.57 MGD. All wells are monitored and controlled by the Company's Supervisory Control and Data Acquisition ("SCADA") system.

During 2019, the average daily production was 2.02 MGD. The Company's peak day of 3.53 million gallons ("MG") occurred on August 4 and 5. For the year, the Company produced 738 MG of water, of which 583 MG was metered consumption to customers.

The Company's water treatment consists of disinfection and corrosion control. Treatment for Wells 10, 12, 13B, 16, 17, 18 and 19 is consolidated in a facility on Winnicut Road in North Hampton; for Wells 6, 8A, 9, 11, 20 and 21 at a facility on Mill Road in North Hampton; and for Wells 7 and 22 at a facility on Little River Road in Hampton. Treatment for Wells 5A and 14 occurs at each well.

The main pressure zone for the system covers most of the towns of Hampton and North Hampton (see CM-1). Pressure is controlled by the Exeter Road elevated tank. The Mill Road Standpipe and Booster is a pumped storage facility within this zone.

The Hampton Beach Pressure Zone serves the Hampton Beach area, and pressure is controlled by the Glade Path elevated tank. Water is supplied from the Main Pressure Zone through the Tide Mill Road and Kings Highway pressure reducing valve (PRV) stations, which are both metered.

The Jenness Beach Pressure Zone serves the system in Rye and a small area in North Hampton. Pressure is regulated from the Jenness Beach Booster and the Maple Avenue and Willow Street PRV Stations, all three of which are metered. The Jenness Beach Booster draws from the Jenness Beach Tank.

Tanks, pump stations, pressure reducing valves and chemical feed equipment are monitored and controlled by the SCADA system.

All meters and service connections (up to and including the service line valve) in the system are owned by the Company. As of December 31, 2019, there were 8,219 active metered service connections (including 67 remaining seasonal services), and 316 active fire services. At mid-year 720 seasonal service connections were activated.

III. CHANGES IN WATER TREATMENT PRACTICES

Q. Describe the water treatment practices performed by the Company?

A. The Company's groundwater sources have very good water quality and require minimal treatment in the form of disinfection and corrosion control. All treatment is performed on raw water prior to entry into the distribution system.

Disinfection involves the use of sodium hypochlorite to inactivate pathogens that may occur in the water. Pathogens are rarely, if ever, observed in raw water, however, a level of chlorine is maintained throughout the distribution system to protect water from contamination in the unlikely event that untreated water may enter the system from main breaks, leaks or cross connection events.

Corrosion control involves the adjustment of pH and addition of phosphate products to minimize corrosion in pipes and fixtures. In 2018, the Company had the engineering firm of Tighe and Bond perform a corrosion control study to assure that Lead and Copper Rule requirements were met. This study defined optimum levels of pH and phosphate to minimize corrosion of lead and copper.

Corrosion control is optimized at a pH of approximately 7.4. At facilities where raw water pH is less than 7.4, pH adjustment is accomplished by adding sodium hydroxide (caustic).

Phosphate products bind to minerals that are present in raw water and help reduce corrosion of pipes and fixtures. In addition to reducing lead and copper levels, phosphate also reduces the occurrence of discolored water. The optimum level of phosphate in finished water is 1.0 mg/L of total phosphate and 0.5 mg/L of orthophosphate. The Company currently uses a combination of polyphosphate (sodium hexametaphosphate) and blended orthophosphate to meet these goals, and is gradually moving towards sole use of blended orthophosphate.

Q. What changes has the Company made to water treatment practices since the last rate case?

A. Based on the Tighe & Bond study, the Company implemented changes to reach the higher pH target of 7.4 from the previous levels of 6.8 to 7.2 and to convert to blended orthophosphate.

pH adjustments have been implemented at three treatment stations (Well 5A, Well 7 and Well 14) where caustic feed systems were already in service. Caustic dose rates were simply adjusted to raise finished water pH a few tenths to the new target. Caustic is not applied at the Winnicut Water Treatment Plant ("WTP") because raw water is already at the target pH.

The construction and start up of the Mill Rd WTP in 2020 added pH adjustment capability for all of the Mill Road wells. As described in more detail below, no pH adjustment was previously conducted due to space and safety issues. The new plant included bulk storage and separate chemical feed systems for caustic. The new plant also was the first facility equipped for blended orthophosphate. Both chemicals are dosed at rates proportional to the plant flow rate.

Blended orthophosphate will be implemented at the other treatment stations in coming years.

Q. Have these changes been effective?

A. The effectiveness of these new treatment systems has been confirmed through water quality monitoring. Continuously operating analyzers measure chlorine and pH in finished water at each treatment facility. The Company also collects samples from the distribution system to confirm that targets are met, and to provide feedback for adjusting chemical dosages.

Chlorine dosages are made to sustain a minimum of 0.3 mg/L at the most distant locations in the distribution system to ensure that water quality is protected from contamination. Since starting the Mill Road WTP, pH levels throughout the distribution system are closer to the desired target of 7.4. Phosphate levels are closer to targets (1.0 total phosphorus and 0.5 mg/L orthophosphate) since starting the Mill Road WTP, and will improve once other treatment facilities are converted to orthophosphate.

The effectiveness of these treatment changes is best evidenced by the results of the last round of lead and copper testing (conducted in the third quarter of 2020). Only trace levels of copper were observed, which is normal considering that samples are collected from homes with copper plumbing. More importantly, lead was observed in only 2 of 60 samples, and only at trace levels. This low occurrence rate is a substantial improvement over the previous round conducted in 2017, when 6 of 31 samples had trace levels of lead. Although the results of both sample rounds met compliance requirements, the goal is to eliminate all lead from drinking water, and these results show substantial progress in that direction.

Q. How have these changes affected chemical doses and expense?

A. Chemical dose rates are optimized by using automated flow pacing systems through SCADA. This programming adjusts chemical feed rates in response to changes in flow rate through each treatment facility. For chlorine and caustic, feed rates are also adjusted based on feedback from continuous chemical analyzers to match target setpoints. The SCADA system monitors these parameters continuously and makes adjustments to chemical feed rates as needed, and without frequent oversight from operators.

Blended orthophosphate is more expensive per unit volume than polyphosphate. The addition of caustic at the Mill Road WTP is also new and will increase total chemical dosages and costs.

These cost increases are partially offset by lower bulk pricing, made possible by the new bulk storage facilities. To minimize costs, chemicals are bid competitively three times per year to obtain the lowest prices.

IV. COST OPTIMIZATION INITIATIVES SINCE THE LAST RATE CASE

Q. What steps has the Company taken to optimize operating expenses since its last rate case?

A. The Company strives to optimize expenses through competitive bidding and other procurement procedures. Between 2011 and 2019, noteworthy expense optimizations have been achieved for purchased power, maintenance of mains and services, transportation and security.

Q. What does the Company do to optimize electricity expense?

A. The Company obtains electricity using multiyear contracts from market suppliers. In 2018, the Company selected EDF Energy Services, LLC to supply electricity to the Company's larger facilities at a flat rate of $0.07902/kwh through December 2021. This rate is approximately 3% lower than the rate of $0.0814/kwh that was in place during the last rate case.

Power costs are also optimized by installing variable frequency drives (VFDs) on most of water pumps. VFDs allow for more energy efficient modulation of pump rates.

Q. What does the Company do to optimize expenses related to maintenance of mains and service connections?

A. Both of these tasks involve excavation of buried mains and services, usually for the purpose of repairing breaks and leaks. The Company optimizes these expenses by seeking competitive pricing from local contractors at least annually, maintaining multiple contractors to call upon, and by paying attention to detail in overseeing this work.

Q. What does the Company do to optimize transportation expense?

A. In 2013, the Company reduced its workforce by one position, which also reduced the number of vehicles on the road by one. The Company routinely replaces one vehicle per year. The vehicle being replaced is typically the oldest and least efficient vehicle in the fleet, and new vehicles typically get better mileage than the vehicles that were replaced.

Q. What does the Company do to optimize security expense?

A. The consolidation of the office and maintenance shops into the current space at 7 Scott Road eliminated one contract security service.

V. PETITION TO END ELIGIBLE WELL MONITORING REQUIREMENTS FROM DOCKET NO. DE 97-226

Q. What is the Eligible Well Monitoring Program?

A. This is a component of the Well Owner's Response Policy implemented in 1997 (refer to Attachment CM-2 for the Settlement Agreement to Docket No. DE 97-226 Exhibit B paragraph 2.1). It was intended to provide private well owners some assurance against possible adverse impacts to their wells from pumping at the Company's production wells.

Q. What are the results of the Eligible Well Monitoring Program?

A. The Company has collected over twenty years of data from the wells. The program included 54 private wells, but has subsequently dwindled to 21 as many well owners have dropped out. As shown in detail in Attachment CM-3 to this testimony, none of the water levels in these wells show any adverse impacts attributable to production well pumping.

Q. Has the Company been contacted by any private well owners regarding any adverse impacts on well levels?

A. I have received no contacts from private well owners on this matter in the 12 years I have been employed by the Company.

Q. What are the benefits to ending the Eligible Well Monitoring Program?

A. The long span of monitoring (over 20 years) produced a large data set that clearly shows that production well pumping has had no impact on private well levels (Attachment CM-3). The program costs between $5,000 and $10,000 per year, but no longer produces any corresponding value, and the Company asks that it be discontinued to reduce expenses.

Q. Do you propose to change any other aspect of the Well Owner's Response Policy?

A. No.

VI. UTILITY PLANT ADDITIONS SINCE THE LAST RATE CASE

Q. Please provide an overview of the capital improvements that the Company has made to its system since its last rate proceeding Docket No. DW 12-085.

A. Please refer to Mr. Lawrence's pre-filed testimony for a comprehensive overview of capital improvements. Below I will discuss projects with the most beneficial operational benefits, specifically the Mill Road WTP (Centralized Treatment), Well 22 and the pending treatment improvements associated with it, and Fixed Base Leak Loggers.

Q. What is the Mill Road WTP (Centralized Treatment)?

A. Please refer to Mr. Lawrence's testimony for details on project cost and schedule. This project consolidated water treatment for all six wells in the Mill Road well field. Previously, water was treated using separate chemical systems at each individual well. The new plant was brought into service in February 2020 and achieved a number of valuable improvements.

The previous chemical feed systems were located in small, inadequately sized buildings that, while allowing for basic treatment requirements, were deficient compared to modern standards for safety, handling and optimized performance. These buildings were holdovers from the original construction in 1950s and 1960s when there were no requirements for treatment. Chemical treatment systems were added at later dates into whatever spaces were available inside these buildings. The new water treatment plant resolves these deficiencies, as described below.

Prior to the construction of the new plant, ten chemical treatment systems were needed to treat water from the six wells. Each required daily visits by operators to resupply chemicals and check on feed equipment status. The new plant reduces these ten chemical feed systems to three. This consolidation improves both operations and maintenance efficiencies. Labor time needed for routine operations is reduced by simply having fewer locations to visit, and fewer systems to check on.

The need to manually transfer chemicals to day tanks at these six individual wells has been eliminated; saving time and improving safety. Operators no longer have to carry and pour 5 gallon jugs of liquid chlorine into day tanks, nor do they have to carry and mix 40 pound bags of polyphosphate. These improvements reduce their direct exposure to these chemicals, and ergonomic risks of manually carrying these heavy weights.

The previous lack of large enough spaces prevented needed corrosion control treatment. Most of the previous spaces did not have space for caustic feed equipment (day tank, pump and pipes). Even for those that did have enough space, the lack of bulk tanks would have required manual transfer of liquid caustic, which was simply too much of a safety risk to implement.

The new chemical feed systems help optimize performance and cost by providing for more consistent chemical feed rates to meet water quality targets. Chemical feed rates are regulated through SCADA based on plant flow rates and feedback from continuous chemical analyzers.

Reducing the number of chemical feed systems also reduces the scope and cost of maintenance activities since there are fewer pumps, tanks, pipes, etc. that require maintenance. Less equipment to maintain also frees operators' time to work on other maintenance activities.

The new plant was constructed to modern standards for spill containment, in the unlikely event one should occur. The reduction in the number of chemical storage locations and availability of bulk tanks reduces the frequency of chemical deliveries, which further reduces the probability of any spills.

The new plant also has its own backup power system that will keep it running when electrical service power is out.

Q. What is Well 22?

A. Please refer to Mr. Lawrence's testimony for details on project cost and schedule. Well 22 is the culmination of two decades of source exploration efforts. During the late 1990s, the Company had water use restrictions nearly every summer; conditions that were exacerbated by the 2000 drought. Due to the recurring need for summer water restrictions, in 1995 the New Hampshire Department of Environmental Services ("NHDES") implemented a moratorium on new service connections in the Company's territory. The moratorium was lifted in 2003 when Wells 20 and 21 were put into service, with a condition that the Company was to continue to explore for additional sources of supply. Source exploration efforts continued through 2012.

Well 22 was drilled in 2012, but full development was put on hold because demands were declining at that time. Per capita metered consumption was trending downward, and the Company was succeeding in its efforts to reduce lost water. However, long-term planning performed during and after the 2016 drought indicated that an additional source of supply was needed to meet projected demands from long term growth. The Company performed well development and permitting work beginning in 2016 that eventually culminated in putting Well 22 into service in the spring of 2020. As noted in Mr. Lawrence's testimony, the well would have been in service years earlier, but for delays brought about by external issues outside the Company's reasonable control. The additional production capacity available from Well 22 enabled the Company to meet demands during the 2020 drought without having to impose any water use restrictions.

Q. What is the Little River Road WTP?

A. Please refer to Mr. Lawrence's testimony for details on the Little River WTP project cost and schedule. The Little River WTP will treat water from both Well 22 and Well 7.

Well 22 lies on the same property as Well 7. Water pumped from both wells is combined for treatment and discharged at a single entry point to the distribution system. Certain improvements to put Well 22 into operation have already been placed in service. Pipes were installed between Well 22 and the pump house, the electrical service was upgraded to meet the demand of both well pumps, and a pump drive for Well 22 and associated controls and SCADA I/O were also installed.

Construction of a new plant building will start in 2022 with the goal of having chemical feed systems for disinfection and corrosion control functional by the end of that year. The new plant will resolve deficiencies in undersized and sub-standard chemical storage spaces and equipment capacities in the current Well 7 pump house, which is currently treating water from both Wells 7 and 22. The current chemical system also needs chemical handling and safety upgrades to meet current standards.

The new plant will also include an arsenic removal system projected to be fully operational in 2023. Arsenic occurs in Well 22 at levels higher than the 0.5 ug/L Maximum Contaminant Level (MCL) that goes into effect in July 2021. To assure the standard is met water pumped from Well 22 is currently blended with water from Well 7, which restricts use of the full capacity of Well 22. Arsenic removal is projected to be fully operational in 2023.

Q. What is the Fixed Base Leak Logger system?

A. This is a system of acoustic leak loggers that are permanently deployed in the distribution system. Their purpose is to improve leak detection and reduce lost water.

Fixed Base Leak Loggers were first installed in 2019. This system consists of acoustic leak loggers that are permanently deployed on valves in the distribution system. The loggers record noises every day, then transmit the information back to the vendor's server, where it is processed for indications of leaks. If noises are loud enough, the software can perform a correlation indicating the approximate location of a leak. Noises indicative of possible leaks are investigated by field staff, and fixed if confirmed.

A major benefit of this system is that the loggers monitor distribution pipes every day, whereas traditional manual leak detection surveys are conducted intermittently (often months apart). This high frequency of monitoring allows for leaks to be discovered and fixed more quickly. Leaks run unfixed for shorter time periods, thereby reducing lost water.

Sixty loggers were installed on valves in May 2019, and covered 16.2 miles of distribution main (12% of the system). The system identified 3 leaks, and also verified the absence of additional leaks after those leaks identified were repaired.

An additional 60 loggers were installed in 2020, expanding coverage to 30.6 miles of distribution system main (22% of the system). Additional loggers are planned for coming years to fill out coverage of the distribution system.

IV. PERMANANCY OF WICA PROGRAM

Q. Please comment on your view of the WICA program from an operations perspective.

A. The WICA program was implemented with the goals of increasing system reliability, improving service to customers, reducing lost water, extending the time period between rate applications, and avoiding high percentage rate increases and rate shock for the customer. Operationally, WICA has produced benefits in system reliability, improved service to customer and contributed to reducing lost water.

System reliability and improved service to customer has benefited from the accelerated main replacement schedule. Older water mains have a higher probability of breaks and leaks, and these probabilities increase as the pipes get older. These events cause unplanned service interruptions and inconvenience for residents and businesses. The average main break costs approximately $5,500 to repair, and some have exceeded $10,000. The average main break also interrupts service to 23 service connections for 5 hours; again some impact more people and for longer time periods. The systematic replacement of mains helps reduce the long term costs and consequences of these events.

Since the start of the WICA program, the Company has replaced 23,476 feet (4.4 miles) of water pipes. Main replacement projects have focused on asbestos-cement, cast-iron and galvanized water pipe. These pipe materials have higher frequency of main breaks compared to other materials (see below).

Pipe Material	Breaks / Mile / Year
Asbestos-cement	0.10
Cast-iron	0.13
Copper	0.47
Ductile-iron	0.03
Galvanized	2.09
Other	0.01

Galvanized and copper mains have the highest break risk compared to other materials. Fortunately, most of these mains have been replaced in the last few years (0.2 miles under WICA projects). The remaining WICA projects replaced 3.6 miles of cast-iron pipes and 0.6 miles of asbestos-cement pipes. These pipes were also some of the older mains in the water distribution system, with an average age of 72 years; ranging between 55 and 106 years of age.

The WICA program also assists in long-term infrastructure renewal. Water mains are not immortal, and degrade over time and result, in the absence of replacement, in the increasing breaks, costs and consequences discussed above. Prior to WICA, the Company conducted five main replacement projects between 2003 and 2009. These projects replaced 14,300 feet of main, an average of 2,040 feet of main per year. At this pace, it would take 362 years to replace the system. Expecting underground water pipes to provide satisfactory water service for over three and half centuries does not seem realistic.

The WICA program has assisted the Company in expanding its main replacement program, which with the addition of the 23,476 feet of pipe, has replaced 40,229 feet of pipe in total since 2010. This is a pace that would take 202 years to replace the system; still a larger than desirable number, but substantially improving the long term projection.

Reducing the frequency of main breaks also reduces the volume of water lost from the distribution system. Lost water reduction benefits include preservation of water in source aquifers, and reduced marginal expenses for pumping and treatment. Savings from lost water reduction cannot be quantified to the WICA program because they cannot be separated from other lost water control activities, especially system-wide leak detection efforts and metering accuracy programs.

The benefits described above reflect the success of the WICA program, and justify the value of making it permanent.

V. COMPANY ACTIVITIES AND PLANS RELATED TO PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS)

Q. Describe the scope of PFAS and its impact on Company operations.

A. Please refer to Mr. Walsh's pre-filed testimony for an overview of the Company's work regarding PFAS.

Q. What are PFAS regulations for safe drinking water and how is the Company achieving compliance?

A. No PFAS were regulated in drinking water until the fourth quarter of 2019, when NHDES regulations became effective for four PFAS compounds. Only one of the Company's 17 wells has PFAS concentrations that exceed the MCLs. Well 6 has PFOA levels that exceed the MCL. The Company currently achieves compliance with drinking water standards by blending water from Well 6 with other wells in the Mill Road well field before entering the distribution system. The PFOA level meets the state standard in water at the entry point to the distribution system. However, meeting this blending target restricts use of the full capacity of Well 6.

Q. Will the Company continue to be able to comply with these regulations? If not, what actions are proposed to achieve compliance?

A. The Company's ongoing PFAS monitoring of these wells clearly shows increasing PFAS trends, particularly PFOA in Well 6, that are projected to approach the MCL in just a few years. This problem cannot be resolved simply by shutting off Well 6 because the data shows a plume of PFAS moving into the Mill Road well field that will eventually reach the other wells.

Based on this information, and in light of the need to preserve production capacity to meet current and future demands, the Company is moving forward on a project to install PFAS treatment at the Mill Road well field. It will consist of granular activated carbon "GAC" filter vessels to remove PFAS. Initially, the system will only treat water from Well 6 (which will also allow for use of its full capacity), however, the system is being designed to allow for relatively simple addition of more filters to treat water from more wells, if the need arises.

Q. When will PFAS treatment be in service?

A. Installation of PFAS treatment equipment (in an existing building) is scheduled for the spring of 2021 with the goal of being operational by the summer of 2021.

Q. What are the expected capital costs and operating expenses for PFAS treatment?

Estimated capital cost for the installation of piping and treatment equipment, and renovation of the existing building is described in Mr. Lawrence's testimony.

Annual operations and maintenance expense is projected to increase by approximately $60,000. These expenses are for replacement of GAC media, water quality sampling for process control, and heating of the renovated space where the equipment will be installed.

Q. Does this conclude your testimony?

A. Yes.