



The State of New Hampshire
Department of Environmental Services



Robert R. Scott, Commissioner

June 7, 2019

Pauline Doucette
Abenaki Water Co Inc.
32 Artisan CT Unit 2
Gilford, NH 03249

Subject: Rosebrook Water (0382010)
Sanitary Survey 2019

Dear Ms. Doucette:

On February 20, 2019, I was onsite and initiated a sanitary survey on the Rosebrook Water system (RW). I subsequently revisited the RW on May 29, 2019. The purpose of the survey was to review the capacity of the water system's sources, treatment, distribution, and management to continually produce safe drinking water. I would like to thank Phil Sausville, primary operator, Taylor deOgburn, operator, and Don Vaughn for their time and assistance in conducting this survey.

SUMMARY

The RW is operated in a professional manner. The most recent water quality monitoring records show that the system is currently in compliance with water quality standards including lead and copper. However, this sanitary survey identified several significant deficiencies related to the existing infrastructure. We understand that the RW has applied for a rate increase from the Public Utilities Commission (PUC) to begin to address these deficiencies. The New Hampshire Department of Environmental Services (NHDES) fully supports the authorization of any funding to make improvements in accordance with the deficiencies and recommendations listed in this report and commend any effort to move forward.

The following **significant deficiencies** are described in more detail at the end of this report and must either be corrected or have a 'corrective action plan' (CAP) provided to this office within 30 days of this letter:

1. System pressures exceed the regulatory limit and need to be addressed.
2. The storage tank requires regular inspections and is three (3) years past due.

The well station requires significant upgrades, the following are the most significant and more are listed below under recommendations:

3. There is currently no chemical containment at the well station, as required.
4. There are two chemical feed systems at the well station. These systems should be completely separate and stand-alone.

In addition, the following is a list of issues that we recommend the managers of the water system consider to maintain compliance, and continue to provide an acceptable level of service to the system's customers:

1. Consider additional source water protection measures.
2. Make a permanent repair of the GPW2 electrical conduit.
3. Install well level transducers to monitor water levels.
4. Install a pH analyzer and residual chlorine analyzer at the well station and connect to an automated alarm system.
5. Install a flow switch on the emergency eyewash station and alarm to notify external parties in the event of activation.

6. Place the electrical panel in the well station on a concrete pad and protect it from water or move it to a separate room/building.
7. Install an intrusion switch on the water storage tank hatch and/or security fence around the tank.
8. Consider the construction of a second water storage tank on the other side of the valley.
9. Locate the water storage tank overflow and inspect regularly to make sure access is screened/blocked from rodents or other small animals.
10. Investigate the location of and reduce system leaks.
11. Develop an Asset Management Program (AMP) for achieving and maintaining the desired level of service at the lowest appropriate cost to customers.
12. Develop a plan for addressing the 16-inch water main located under the ski resort either separately or included in an AMP.

A more descriptive discussion on each of these issues is included below under "Recommendations".

SYSTEM DESCRIPTION

General

The RW provides domestic water and fire protection to approximately 408 service connections, and a total estimated population served of 1020 people. The average reported daily water usage is less than 100,000 gallons per day (gpd) during the slow seasons in the spring and fall, and as high as 150,000 gpd during peak winter and summer seasons. The maximum daily demand can be as high as approximately 250,000 gpd in the winter.

In general, the water system is comprised of two gravel packed wells (GPW), one well station, one storage tank, and associated piping and appurtenances.

Water Sources

The water sources are summarized as follows:

Source	DES Data Base 0382010-	Well Type	Well Depth (feet)	Safe Yield (gpm / gpd)
GPW 1	001	Gravel well	43	350 / 504,000
GPW 2	002	Gravel well	45	450 / 648,000

GPW 1 is located within the well station with a turbine pump and 40 feet of 12 inch diameter steel well casing. GPW 2 is located 90 feet east, southeast of the well station with a submersible pump and 45 feet of 12 inch diameter steel well casing. The Ammonoosuc River flows nearby the wells.

The two wells are not operated simultaneous and alternate regularly. A sample tap is located on the common manifold line for the wells. There is currently no well level transducer in either well to determine the water level.

Treatment / Pumps, Pumping Facilities, and Controls

Water from the wells is treated with soda ash for corrosion control and sodium hypochlorite (NaOCl) for disinfection. A chemical mixture of dry soda ash, water, and liquid NaOCl is batched into a 625 gallon bulk storage tank approximately every two weeks. The mixture is injected and a combined source totalizing meter is in place on the manifolded well line.

There is no pH meter or chlorine residual monitor, but the pH and chlorine levels are manually checked whenever operators are onsite (three times per week). The wells start and stop automatically via a signal from

the storage tank level. Alarms for power and tank level call out and send texts to the operators. A standby generator is located at the well station to provide backup power when necessary.

Finished Water Storage

Water from the wells flows into a 16-inch distribution line and up to the 650,000 gallon atmospheric storage tank located slope side of the Bretton Woods Ski Area. The level transducer in the tank is connected to an adjacent radio panel.

The tank's roof has been reconstructed and/or upgraded since originally installed. It is an aluminum decking roof covered in an HDPE liner and supported by galvanized steel bar joists. The previous inspections of the tank, dating back to 1994, recommended replacement of the liner and additional upgrades to the tank. A fence around the tank has also been recommended previously.

The water storage tank is summarized as follows:

Storage Tank	Type	Capacity (gal)	Installed	Last Inspected
Bretton Woods	Buried Concrete	650,000	1974	2010

Distribution

Distribution piping is mostly ductile iron ranging from 8 inches to 16 inches in diameter. Water gravity feeds the distribution from the atmospheric storage tank. Because of the hydraulic grade line, this creates excessive pressure throughout the system in order to maintain minimum pressures in the upper areas. Pressure can be as high as 200 psi in some areas and as low as 35 psi in others. Some of the service connections include the Mount Washington Hotel and several other commercial properties as well as a community of second homes and condominiums.

The system serves fire demand by way of some internal sprinkler systems and approximately 64 exterior hydrants. The distribution system is reportedly flushed twice per year and valves are exercised periodically so that all valves are checked once per year. Residential meter reads are performed via radio read on a monthly basis and the system has all new meters as of 2017.

Monitoring, Reporting, and Data Verification / Water System Management and Operation

Water quality monitoring records show that the system is in compliance with current standards. However, the RW does not currently have an AMP and the excessive system pressures have not been addressed as previously recommended. The excessive pressures put a hindrance on operations as well as causing costly failures and repairs.

Staffing and Operator Certification

The RW is required to retain an operator certified at the grade 1 treatment level and the grade 1 distribution level. The following certified operators are listed as operators for this system:

Operator	Certificate No.	Treatment Level	Distribution Level
Philip Sausville	3692	1	1

Operators are reported to be onsite three days per week to check on the system.

ACKNOWLEDGEMENTS

1. The RW is operated in a professional manner and the system is in compliance with water quality standards.

2. We commend management for installing new radio read meters in 2017 and going to monthly billing. This provides management with more accurate non-revenue water calculations and the consumer with better information about water use and cost.

RECOMMENDATIONS

Significant Deficiency

There were four deficiencies noted during this inspection which are termed 'significant' as it has the potential to affect environmental safety and/or reliability. A significant deficiency must be corrected within 30 days. Alternately, for a deficiency which cannot be corrected within that time period, a 'corrective action plan' (CAP), identifying the action proposed to be taken, and timeline for the corrective action, shall be forwarded to this office within 30 days. The CAP submitted by the system owner shall identify any interim measures that will be taken in order to provide sufficient protection pending final action. Note that the owner shall not make any modifications to an approved CAP without first obtaining approval for the modifications from DES.

The following **significant deficiencies** were noted:

1. System pressures exceed the maximum allowable per New Hampshire Rules and Regulations, specifically the Recommended Standards for Water Works as referenced in Env-Dw 404.01. These rules state that when static pressures exceed 100 psi, pressure reducing valves shall be provided and the normal working pressure should be approximately 60 to 80 psi (410 - 550 kPa). The issue of elevated system pressures has been raised by NHDES in the past and needs to be addressed to bring the system in compliance with our rules. We understand that the RW has applied for a rate increase from the PUC to specifically address this deficiency and ask that the plan of action be submitted to NHDES as soon as possible, and at a minimum a schedule be submitted within the next 30 days.
2. Records indicate that the finished water storage tank was last inspected in 2011. Env-Dw 504.09 requires that tanks be inspected every five (5) years. These inspections should take place as soon as possible to confirm the extent of work that is required to properly maintain the tank. Previous inspections have recommended improvements, some of which have not been performed. In addition, this survey noticed some gaps between the sidewall and tank cover and NHDES would like confirmation that these areas are not a potential access points to the tank interior for insects and rodents. The overall condition of the tank is also important to determine prior to any work be planned on the system.
3. The well station does not have any chemical containment for storage of chemicals, or for the bulk mixing tank. Containment is required for hazardous chemicals for operator safety and in this instance, for protecting the surrounding building soils from contamination. There cannot be any drains in the containment area that are sent outside of the contained area. All of the bulk storage tanks, day storage tank, and chemical pumps must be contained. The Recommended Standards for Water Works requires that chemical containment is provided for 100% of the volume of the largest container.
4. Both chemicals, soda ash and NaOCl are mixed into the same tank. This tank makes it difficult to hold a consistent chlorine residual level, making the system's chlorine residual difficult to maintain. This tank also makes recording daily quantities of NaOCl more of an estimate than an accurate quantity. In accordance with Env-Dw 503.10, operators should maintain accurate recordings of the daily quantity of each chemical used. Each chemical feed system should operate on its own. Separate storage, piping, and pumping equipment are required for the injection of NaOCl. In addition, the installation of a second injection point is necessary.

Below are areas where improvements or operating adjustments are recommended, some of which could lead to significant deficiencies in the future if not addressed:

Water Sources

1. Wellhead protection is an important responsibility for every public water system. According to our records there is fuel storage (potential contamination source) within your wellhead protection area. As discussed during this survey, preventing contamination in the wellfield is the most prudent and cost-effective approach to protecting sources of drinking water used by public water systems. NHDES recommends that you consider additional wellhead protection measures such as expanded public education and installing fencing around the well site. If interested, source water protection grant applications are due to NHDES in November each year. Please contact Andrew Madison at andrew.madison@des.nh.gov or 271-2950 if you are interested in applying for this grant.
2. GPW 1 has a broken electrical conduit that has been fixed with tape. This is not a permanent solution. The conduit should be repaired properly to avoid contamination of the well.
3. There are concerns that the wells may potentially be over-pumping. This cannot be determined without knowing the water level in the well. NHDES highly recommends the installation of well level transducers for each well. In addition to determining if the wells are over-pumping, this will also allow operators to more effectively monitor the health the wells.

Treatment

4. Anytime there is addition of chemical treatment to a water supply, the risk to public health is increased. The RW manually samples for pH and chlorine residual in the system more than once per week, the minimum requirement under The New Hampshire code of administrative rules. However, DES recommends that a more conservative approach to protect against both high and low target pH and chlorine residual levels is implemented through the installation of online instrumentation. The instrumentation should also connect into the existing alarm system.
5. NHDES recommends that the eyewash station have a flow switch installed so that an alarm can be communicated in the event of activation. This is a great safety feature for operators in the event of a chemical spill.

Pumps, Pumping Facilities, and Controls

6. The well station is a single room structure that houses electrical equipment, pumping equipment, emergency showers, and chemicals. The electrical equipment is not on an equipment pad and although is away from the pumping equipment and emergency shower, the floor can get wet, and the equipment could also get sprayed in a situation of a leak. This is a safety issue for the operators and should be addressed.
7. There is no intrusion alarm on the water storage tank hatch and no fence protecting the area from passersby. The RW is a system with the entirety of the drinking water storage in one tank. The tank, and its contents, should be better protected to prevent contamination of the system's drinking water supply.

Finish Water Storage

8. The system has only one storage tank up the mountain side but also serves water to the other side of the valley. The pressure reduction project proposes a number of pressure reducing valves and booster stations for the system, but a second tank on the other side of the valley would also provide better reliability to the overall system. This could be done conjunction or separate from the pressure reduction project.

9. The location of the outlet to the tank overflow was not determined or inspected during this survey. Operators should locate the overflow outlet, inspect it, and report back to NHDES on the condition of screening or other protective measures to prevent access to the tank through this overflow outlet.

Distribution

10. Non-revenue water is reported between 15%-20%. We recommend RW consider applying for a Leak Detection Grant from DES so an investigation into the leaks can be performed professionally. Once located, the leaks should be repaired or pipes replaced, which can be done as part of an AMP.

Water System Management and Operation

11. NHDES recommends developing an AMP to help you get the most value from each of your assets and have the financial resources to rehabilitate and replace them when necessary. This program offers a matching grant up to \$20,000 for water systems to perform a system assessment and begin asset management initiatives. Asset management helps a system make critical decisions about how to achieve and maintain the desired level of service at the lowest appropriate cost to customers. We highly recommend the RW consider applying for this grant. Contact Luis Adorno at 271-2472 or Luis.Adorno@des.nh.gov for more information about our Asset Management program.
12. At some previous time, management allowed (knowingly or unknowingly) the construction of a building expansion at the ski resort that was erected over the dedicated 16-inch main that serves the water tank. The contractor on that project should have been required to move that water main at that time to maintain proper access to this underground asset. NHDES recommends a plan be put in place to have that water main looped or a new water main constructed and that line abandoned. The urgency on this work should be part of an AMP.

As a general reminder, RSA 485:8 states that no new construction, addition, or alteration involving the source, treatment, distribution, or storage of water in any public water system or privately owned redistribution system shall be commenced until the plans and specifications have been submitted to and approved in accordance with rules adopted by the department; except, if such construction, addition, or alteration is exempted by the department because it will have no effect on public health or welfare, then such submission and approval is not required.

If you have any questions please contact me at Randal.Suozzo@des.nh.gov or 271-1746.

Sincerely,



Randal A. Suozzo, P.E.
Drinking Water and Groundwater Bureau

cc: Phillip Sausville, Primary Operator



Randal A. Suozzo, P.E.
Drinking Water and Groundwater Bureau
P.O. Box 95
Concord, N.H. 03302

June 13, 2019

Dear Mr. Suozzo:

This is to confirm receipt of your comprehensive and detailed sanitary survey report for the Abenaki Water Company Rosebrook system. The report is constructive and presents a framework from which Abenaki can utilize to place the Rosebrook system into a position of compliance.

The itemized **significant deficiencies** enumerated in the report are of paramount importance to the Company (Abenaki), its operations, customers and management. The following responses to address the specific significant deficiencies are presented in the order as listed in the report.

Significant Deficiencies

1. System pressures exceed the regulatory limit and need to be addressed.

Response – The company is acutely aware of the excessive/extreme system pressure in the Rosebrook system. Since its acquisition in 2016, Abenaki has focused on the problem and solution and has expended a great amount of resources dedicated to laying the foundation for the Rosebrook system to reach full operating compliance in accordance with Env-Dw 404.01. However, the scope of the solution is significantly beyond Abenaki's financial capability to fund and therefore it is in unquestioned need of regulatory support to execute the solution as detailed in PUC docket DW 17-165.

Engineering plans/specifications estimated at approximately \$100,000 and identified as step II in the above docket, as well as consecutive construction phases punctuated by PUC investment recovery filings are all necessary parts of the solution to reduce system pressures to compliance levels. Further, and not the least of all, are the important enhancements to operator safety, system reliability, expected reduction of property liability, wear and tear, and energy consumption.

Rosebrook's excessive pressure condition has been in existence since its 650,000-gallon storage tank was unfortunately located at its present location. Consequently, because of all the factors involved in addressing the issue, pressure reduction cannot be accomplished in the next 30 days and therefore forward remedies must be detailed in a **corrective action plan (CAP)**. The CAP is outlined in DW 17-165.

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Abenaki is fully cognizant of DES communication and approvals; however, it must receive PUC concurrence to proceed with its initiative as contained in the previously mentioned PUC docket.

2. The storage tank requires regular inspections and is three (3) years past due.

Response – The company has executed an agreement with an experienced tank inspection contractor to perform the work. The inspection is anticipated to take place within the next 30 days.

3. There is currently no chemical containment at the well station, as required.

Response – The well station which houses chemical supplies and treatment equipment, remains configured as it was when originally constructed and placed into operation. It is Abenaki's proposal to install chemical containment as part of the pressure reduction plan outlined in the response to significant deficiency No.1. Therefore, the company suggests this be included in that CAP.

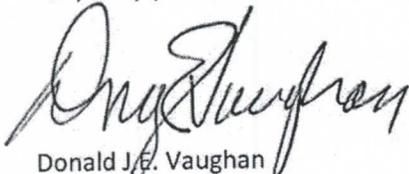
4. There are two chemical feed systems on the well. These systems should be completely separate and stand alone.

Response – The company recognizes this situation and agrees the systems should be separated. This operating condition has been long standing and is a result of the difficulties associated with chemical injection into excessive pressures. The company proposes correction to the condition be included in the CAP of significant deficiency No.1.

Regarding the recommended improvements and/or operating adjustments, Abenaki acknowledges that most can be accomplished through the pressure reduction plan. Others can be implemented within day to day operations.

We hope this letter is responsive to the sanitary survey. Please do not hesitate to advise if you have questions or comments.

Very truly yours,



Donald J.E. Vaughan
Chairman
Abenaki Water Co.