

Smugglers' Notch Water System / Information for Owners - August 3, 2020

Regulatory Framework

Smugglers' Notch Water System is classified by the State of Vermont as a Public Community Water System. As such, it is regulated by the State of Vermont, Department of Environmental Conservation Drinking Water and Groundwater Protection Division (DWGWP). DWGWP regulates water systems according to the Vermont Water Supply Rule (see Testing and Monitoring below). Vermont regulations incorporate Federal regulations or enhance them in some areas. DWGWP issues the System a Permit to Operate with various conditions and requirements. The DWGWP requires the System to file monthly operations reports and conduct sampling and testing for a variety of constituents as described further below. The system is required to develop, maintain, periodically update, and have approved various sampling plans, including the following:

- Lead and Copper; more on that below
- Disinfection Byproducts; intended to monitor the formation of potentially harmful constituents formed as a result of the use of sodium hypochlorite (chlorine) for disinfection
- Coliform Bacteria; monitoring for the presence of total coliform and e.coli bacteria
- Long Term 2 Surface Water Treatment Rule; a program that monitors for constituents of potential concern associated with the use and treatment of surface water sources.

In addition to these sampling plans, the System is required to develop and periodically update a Source Protection Plan. DWGWP personnel conduct a physical inspection of all components of the water system every three years, known as a Sanitary Survey. Annually, the System is required to issue a Consumer Confidence Report to all system users.

In addition to the regulatory oversight provided by the DWGWP, Public Water System rates or fees are regulated by the Vermont Public Utilities Commission (PUC). Smugglers' has not brought a rate case before the PUC since 1987. Consequently, we are currently investigating what is involved in conducting a rate study and rate case. This effort would provide the mechanism to ensure that appropriate rates are being charged across all users, including residential and commercial, and that the System can recover required capital expenditures in the future.

System Description; sources and physical plant

Smugglers' Notch Water System is made up of many components including water sources, treatment facilities, storage facilities, and distribution. Water for the System is provided by both surface water and groundwater. The approved maximum day production rate of the system is 294,048 gallons per day. This assumes all sources are operated at their approved rate for 24 hours. In practice, we look at capacity in terms of a 12 hour production rate or a volume of about 147,024 gallons per day. This is the rate at which the System can be safely operated without overtaxing the groundwater sources. The surface water source is rated for 77,760 gallons per day although it can produce considerably more if needed. Groundwater sources provide the bulk of the water used by the System. The System has some reserve capacity, currently about 27,000 gallons per day from a regulatory perspective.

The surface water is fed from the Morse reservoir, located above the Village on the No Name Brook, holding about 2.1 million gallons. Water is fed from this on stream impoundment to the Village via underground pipe. The water used for domestic purposes is treated at the filter plant located behind Nordland. Treatment consists of the injection of a polymer to promote coagulation and flocculation, the addition of sodium hypochlorite (chlorine) for disinfection, the addition of soda ash (sodium carbonate)

for corrosion control, and filtration. This plant was replaced with a new facility that went on line in December of 2018 at a cost of over \$500,000.

The Morse reservoir is also the source for fire protection water. Fire protection water is delivered through a separate distribution system from domestic water and serves fire hydrants and sprinkler systems throughout the resort. Snowmaking water can be drawn from the Morse reservoir through a separate intake from that supplying the domestic and fire protection needs. However, due to the requirement to maintain a high downstream conservation flow from the reservoir, Smugglers' has not withdrawn any meaningful amount of water from this source for snowmaking in recent years.

Since it is an on stream impoundment, the Morse reservoir can be a maintenance problem. It has to be dredged every three to five years to remove accumulated organic debris. The infrastructure associated with the impoundment is aging and will require upgrading or replacement in the near future. Due to these factors, Smugglers' has begun the process of investigating the removal of the impoundment and replacing it with an offstream storage tank fed by an instream withdrawal structure. The impoundment acts as a dam on the No Name Brook. Dam removal has considerable environmental benefits and the resort has engaged several interested parties including various State agencies, US Fish and Wildlife, and the Lamoille County Conservation District office in this effort.

The groundwater sources for the System consist of 8 drilled wells. The wells are located upslope of all existing resort development and are bordered by State land. The yields of the wells range from 2.7 gallons per minute to 38.5 gallons per minute. Well depths range from about 600' to as much as 900'. The groundwater sources from the system do not require treatment. However, because the groundwater is blended with treated surface water in some parts of the system and surface water is required to be disinfected, the System must maintain a residual level of sodium hypochlorite throughout distribution. Therefore, the groundwater sources are injected with sodium hypochlorite prior to distribution.

All water used by the System enters storage prior to distribution. All storage in the System consists of in ground concrete tanks. The treated surface water is stored in a series of four tanks with a volume of 128,030 gallons. Six of the groundwater wells feed into a separate storage tank with a volume of 86,210 gallons. The other two groundwater wells feed into a 10,000 gallon storage tank and there is an additional 10,000 gallon storage tank feeding the West Hill development. The total storage is 230,640 gallons. While not all of these storage tanks are full at all times, the storage volume is more than adequate to maintain water supply for at least 24 hours in the event of a power outage or other disruption to production by the System.

Water is conveyed from storage through most of the distribution system by gravity. A pump station is used to pressurize the upper portion of Willows Hill and there are in building booster pumps serving the Falcons and Owls 13-24 homes. Willows Hill, West Hill, and the majority of the North Hill receive only well water. The core Village area and the lower portion of North Hill receive a blend of treated surface water and well water. During lower occupancy periods or for system maintenance purpose, only well water may be used in the Village core. Treated surface water can be pumped throughout the distribution system in the event of emergency. Piping consists of PVC and transite (asbestos-cement) mains. Service lines connect the buildings to the mains and they generally consist of copper, PVC, or polyethylene pipe. There are no known lead pipes in the distribution system.

Knowing that the word asbestos associated with the distribution piping may raise concerns, be aware of the following:

- Asbestos cement (A-C or transite) pipe was widely used for water system distribution, particularly from the 1950s into the 1970s. Its use for new installation has been largely discontinued due to the issues associated with air borne fibers created during production and installation processes.
- According to several sources, there are no known health risks associated with the use of A-C pipe in distribution systems. Like all Public systems, Smugglers' is required to periodically test for asbestos and it has not been an issue.
- There is no mandate to remove A-C pipe from distribution systems. However, the service life of A-C pipe is generally considered to be 70 years. For this reason, planning to replace or refurbish these mains will be necessary in the future.

Water production and usage is closely monitored system wide through the use of meters measuring production and distribution. However, there is no metering in place on individual residential or commercial facilities.

Water System Testing and Monitoring

Smugglers' Notch Water System is required to test water from the sources and/or from distribution for a wide variety of contaminants including those listed below. The complete list of contaminants tested is quite lengthy in some categories but some examples are shown.

Volatile Organic chemicals including vinyl chloride, benzene, styrene, toluene, xylene, and more
Inorganic chemicals including arsenic, asbestos, mercury, nickel, nitrate, nitrite, and more
Radionuclides including combined radium 226 & 228, uranium, tritium, and more
Coliform/E. Coli (bacteria)
Lead and Copper
Disinfection Byproducts including Trihalomethanes and Haloacetic acids (TTHM and HAA5)
PFAS; Per and polyfluoroalkyl substances

The frequency of testing requirements varies for these different contaminants ranging from monthly to quarterly to semi – annually to annually or longer intervals. Sampling requirements can change over time based on the results. Sampling frequency is dictated by DWGWP through the Vermont Water Supply Rule (see below for more on the Water Supply Rule). DWGWP publishes the monitoring schedule for each public water system as well as the results. Anyone can view the monitoring schedule and results on line at <https://anrweb.vt.gov/DEC/DWGWP/SearchWS.aspx>. Once you are on the site, enter the water system ID # 5151, select which data or schedule you wish to view, hit search, then click on "Select" on the bar that comes up and you're on your way to multiple years of data. The one problem with the sampling results is that the database does not tell you if, when a contaminant is detected, it represents an exceedance of an allowable level. For that information, you need to visit the Vermont Water Supply Rule, Subchapter 21-6, Drinking Water Quality Requirements. The Water Supply Rule can be found at:

<https://dec.vermont.gov/sites/dec/files/dwgwp/DW/Watr-Supply-Rule-March-17-2020.pdf>.

Sampling is conducted by the Certified water system operators employed by Veolia, Smugglers' contract operating firm. Testing is conducted by an approved certified laboratory, Endyne, located in Williston, Vt. Endyne sends the sample results to the operators and the Drinking Water and Groundwater Protection Division (DWGWP) at the Vermont Dept. of Environmental Conservation. DWGWP notifies

the operators in the event a contaminant level is exceeded or other violation occurs and dictates the required follow up action. Follow up action generally includes public notice requirements.

Lead and Copper

The System is currently required to sample and test for lead and copper twice annually. 20 sites are sampled throughout the resort following the System's State approved Lead and Copper Sampling Plan. The plan was developed based on State/Federal requirements. The approved sampling sites consist of all 8 of the Telemark units and twelve sites chosen from a pool of the following locations; Sterling 1-10, Commons 1-10, Mountainview 1-20 and 21-44, Riverside, Slopeside, Liftside, Villamarksauna, Hakone, Nordland, Evergreen, Oaks, Willows I, Mt. Laurels, Sycamores 1-18, Falcons, Tamaracks 1-12 and 25-36, and the Rental shop. The sites were chosen on the basis of age of construction (Telemark) and location within the distribution system. During every sampling event, all 8 of the Telemark units must be sampled and the other 12 samples can be selected from the remaining pool of sites. As copper is not an issue, this discussion will focus on lead.

The lead sampling data can be viewed on line as outlined above. The data for lead is shown in Mg/l for the units of measurement. To convert to parts per billion (ppb), move the decimal point 3 places to the right. For example, .002 Mg/l converts to 2 ppm. See the next paragraph for relevance.

The EPA established an Action Level for lead in drinking water of 15 parts per billion (ppb). The MCLG (maximum contaminant level goal) is zero. To put this into some context, the allowable lead level in bottled water is 5 ppb although it is generally less according to the DWGWP Compliance Analyst overseeing the lead program. The State of Vermont recently adopted an allowable lead level in schools and child care centers of 4 ppb. Treatment may be required if levels exceed that, based on additional assessment.

The EPA Action Level is defined as "The concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow." The Action Level in this case is determined by looking at the 90th percentile across the 20 samples. Early on during the lead sampling program, this Action Level was exceeded and the System was required to institute corrosion control. Corrosion control consists of the addition of sodium carbonate to the surface water treatment process to adjust the pH of the water, making it less aggressive. Since that treatment was added, the Action Level was exceeded again last fall, triggering a requirement for additional sampling to see if corrosion control was being optimized, which it was.

Some lead content can be found in most of the older Village homes as is evidenced by the testing data. It is believed the source of lead in drinking water found in resort homes is primarily a function of content present in solder used in building piping and that found in fixtures, primarily faucets. Repeated testing shows no lead in any of the source water. There is no evidence of lead pipes used in the distribution mains or building service lines. The testing results consistently show very low or non-detectable levels in newer homes. Why is this? The standards for allowable lead content in plumbing have changed over time so older homes are more likely to have higher lead content fixtures and/or solder that can leach out as water sits in the plumbing.

The normal sampling routine for the System involves taking a single one liter sample from each site after the water has been unused for a minimum of six hours. After discussion with the DWGWP, we have previously conducted sampling for some individual owners on a two sample basis; one 250 ml first draw

and a one liter draw after a 30 second flush. The 1st sample indicates that the fixture may be the contributor while the 2nd is more indicative of solder content. For owners who are concerned and wish to have some testing done in their home, System operators can take samples when the next round of System sampling is done, which will likely be in early September. We recommend the testing be done on the two sample basis described. There will be a charge of \$50, the cost of the lab analysis (\$25 per sample). We will forward the results upon receipt via email. Owners who wish to do so should notify us via email at mdelaney@smuggs.com prior to August 28th. You can elect to have only a single one liter sample taken for a charge of \$25 if you wish.

What to do? The problem is pronounced in some of the Telemark homes. We're not experts so here's what the DWGWP had to say when we asked how to advise the Telemark owners:

The MCLG (maximum contaminant level goal) is zero, it's best to get lead as low as possible, and flushing, filters, and tap replacement are possible ways to reduce lead. The 15 ppb standard is really a screening tool for water system regulation, not a standard for individual taps.

Flushing is almost always helpful, and your results confirm that (not sure how long the flush was but the pattern is clear across your water system). All but one of the Telemark flush samples were under 5 ppb which is still the bottled water standard (though most bottled water is much lower than 5 ppb). Flushing is definitely a good reminder at seasonal properties, even short-term small volume flushing. Requires people to remember or be reminded, but low tech and some flushing happens naturally from using water for a whole variety of things anyway. The other routine maintenance is cleaning out aerators/screens.

Replacement with new fixtures will also help bring down lead. Since you used a 250 mL first draw, those results mainly reflect the fixture. Units 1-4 in particular are high on first draw, so fixture replacement could be expected to make a meaningful difference on the first-draw results. Fixture replacement would also probably lower the other 4 units a little and the flushed results, but less of a difference. Lead data tends to be a bit noisy and variable based on temperature, water use patterns, etc. so you can sample the same faucet over and over and get slightly different low results, which is why I'm saying things like "expected" and "probably". If people buy new fixtures on their own, make sure they're buying them from reputable companies and that they're modern low-lead fixtures, not just anything off the internet or that they brought from another property.

ANSI / NSF 53 certified filters at the point of use will take out lead. They can be a tricky option for infrequent use because many of them use GAC which can grow bacteria eventually, and figuring out the right maintenance interval is not obvious. The units that attach to faucets are usually recommended so they can't be bypassed, but those often don't fit on bathroom taps so you'd still use flushing for bath fixtures. Having those on kitchen sinks permanently might make flushing trickier. There are a small number of pitcher units certified. But again this is up to the individual homeowner and what options they prefer. Some refrigerator filters reduce lead, but again the filters should be replaced periodically.

The staff at SNHA are currently working with Telemark owners on mitigation strategies for their homes. It is likely this effort will provide additional information for owners in other buildings. In the meantime, the best thing those with concerns can do is flush your water until it runs cold when using for drinking and cooking. Since there is no lead in the source water or distribution piping, this will significantly reduce or eliminate exposure.

Consumer Confidence Reports

The System is required to issue annual Consumer Confidence Reports. This report is placed in all homes and posted on the Owner's page on Smugglers' website. You can link to the 2019 version here; https://www.smuggs.com/pages/pdf/H2O_System_Report_2019.pdf

The report provides important information about the water system's performance and water quality over the prior year to all consumers. Notable in the 2019 report are the "Uncorrected Significant Deficiencies". The Inadequate Filtration/Disinfection/Water Supply was corrected by the installation of the new filter plant in December of 2018. The Inadequate Chemical Application Facilities refers to the method of chlorine addition to the well water sources. DWGWP has reversed their stance on the existing facilities over time. Currently, system modifications are being made to address the matter and will be completed in the first week of August. The June deadline for completion was missed due to delays associated with COVID shut downs.

Daily Operations

The Chief Mountain and Corporate Matters Officer has primary responsibility for the oversight and operation of the water system. The Chief Mountain and Corporate Matters Officer provides financial and administrative support and directs the operations and improvements to the water system. The Smugglers' Notch Resort has contracted with Veolia Water of North America, NE Region located in Boston Massachusetts to provide day to day operations. Veolia has three full time employees assigned to Smugglers' Notch for this purpose. The operators oversee, conduct testing, prepare reports and provide daily maintenance of the system. The operators are required to have a Class 4 Operator's License. Other SNR personnel provide assistance with maintenance and repairs to the facilities on an as needed basis. Major upgrades are typically contracted to outside firms knowledgeable in water system improvements.

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