APPLICATION REPORT

Water & Wastewater

Disinfection of drinking water for a mountain ski resort

- Continuous monitoring of chlorine concentration
- Combined measurement of free chlorine and pH in one system
- Reduced maintenance due to automatic sensor cleaning

1. Background

Sugarloaf Water Association is a privately owned, non-profit water purveyor, delivering safe and dependable tap and fire suppression water to the Sugarloaf Resort Community, Maine (USA) which features a large and very popular ski resort. On average their water system provides 142,000 US gal/d (537,500 l/d) in the peak winter season and 56,000 US gal/d (212,000 l/d) in the summer.

2. Measurement requirements

A regular check of the chlorine content is needed to ensure that residual chlorine is in a proper range so that it is still high enough in the water before it is stored to prevent contamination and that the maximum limit value for chlorine concentration of 4 mg/l set by the drinking water authorities of the State of Maine is not exceeded. At Sugarloaf Mountain, the chlorine value is typically adjusted between 0.5...1 mg/l for water storage.

The resort operations call for the chlorine value to be tested once daily by a grab sample and lab analysis. However, in order to guarantee high water quality, the purveyor has also been using continuous chlorine concentration and pH monitoring at the pump station. The pH values are monitored to be in a range between pH 7 and 8.

A membrane covered amperometric chlorine sensor was used but probe contamination was a major issue due to the relatively high mineral content (iron, manganese) in the water. The membrane clogged very quickly and weekly manual cleaning as well as an almost monthly exchange of the membrane was necessary. On top of that, the sensor drifted and daily recalibration against the lab analysis results was needed. Therefore the water utility was searching for a more reliable solution that requires less maintenance.

KROHNE

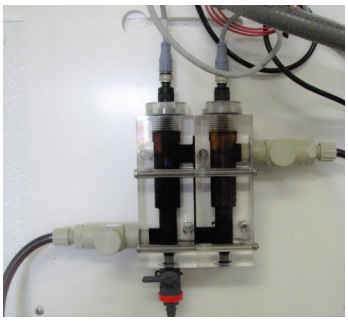
3. KROHNE solution

KROHNE supplied the OPTISYS CL 1100 analytical system for measuring free chlorine concentration. The pre-wired and completely mounted system is already equipped with the MAC 100 analytical transmitter and a membrane-free chlorine sensor with two flow cells (one is for temperature) and valves. After an extended test and evaluation period, the operator decided to upgrade the system to add a pH measurement. Another flow cell with a pH electrode has therefore just been added to the disinfectant system.

The ready to use system features automatic cleaning which is factory set to once daily. However, due to the high mineral content of the water, the automatic cleaning interval was increased to 4 times per day. After that the chlorine value was very stable and re-calibration and manual cleaning was reduced to once a month (compared to a weekly cleaning and daily adjustment with the previous system).

Pump station where the measuring system is installed

Installed OPTISYS CL 1100



Flow cell of the OPTISYS CL 1100 with automatic cleaning

Free chlorine sensor after 8 months of operation

4. Customer benefits

The operator is now able to measure free chlorine concentration, pH value and temperature all with one analytical system in real time. The values are displayed and logged in the central control system of the Sugarloaf Mountain Water Association. By measuring the parameters continually before providing them to the resort gives the water purveyor additional water quality certainty.

The company also stands to gain from greatly reduced maintenance costs and workload. Due to the system's automatic cleaning feature, sensor clogging is no longer an issue. The maintenance interval is reduced to once monthly with no membrane or electrolyte consumables needed. The ease of operation of the system is another benefit. Given that free chlorine and pH can be measured with just one system, there is no need to operate or service two different systems.

5. Product used

OPTISYS CL 1100

- Potentiostatic amperometric disinfectant measuring system for water and wastewater
- Completely mounted with MAC 100 analytical transmitter (Output: 3 x 4...20 mA)
- All-in-one measuring solution with chlorine sensor, valves, flow-through holders and optional pH sensor for a wide application range
- Combination of a membrane-free sensor for Cl_2, ClO_2 and O_3 with 2 gold electrodes, an optional pH sensor and an analytical transmitter
- Automatic Sensor Cleaning (ASR) feature

Contact

Would you like further information about these or other applications?
Do you require technical advice for your application?
application@krohne.com

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