HORIBA
Process & Environmental

Case study

Ammonia nitrogen monitoring in water recycling process

HORIBA ammonia nitrogen meter has been successfully used at the Orange County Water District (OCWD) to optimize chlorine usage.

1 Overview of OCWD

OCWD is an internationally recognized leader in the water industry, and its international reach is growing. It takes the limited water supply found in nature and supplements it to provide water for more than 2.5 million people in Orange County, California.

This water district recycles wastewater from Orange County Sanitation District (OCSD), a regional treatment facility. The process utilizes advanced technologies such as microfiltration (MF), reverse osmosis (RO), and ultraviolet light (UV) with hydrogen peroxide to purify the wastewater to meet or exceed drinking water standards (Fig 1). The RO system, in particular, is impressive in both its size and treatment efficiency, producing 100 million gallons per day of water near-distilled in water quality at 85% recovery.

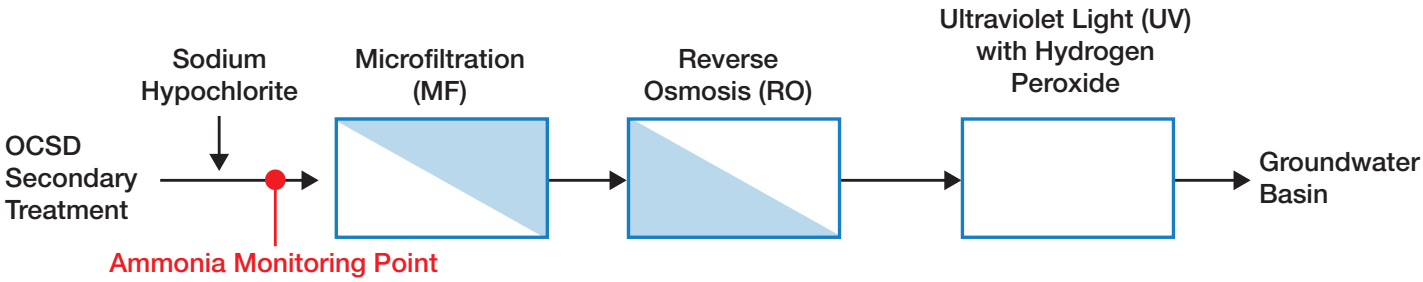


Fig 1. OCWD water purification process.

2 Ammonia monitoring

Sodium hypochlorite is dosed for disinfection and to control membrane biofouling. However, free chlorine can damage certain MF and all RO membranes that are critical for water treatment. By maintaining an ammonia nitrogen residual in the water, free chlorine combines with the ammonium to form chloramines that are less harmful to the MF and RO membranes. Ammonia nitrogen is monitored to determine the amount of chlorine to dose and to assure that free chlorine does not break through. OCWD had been using an ammonia nitrogen meter from another manufacturer on the same source water, but it was prone to periodic failures due to fouling and frequent sensor replacement.

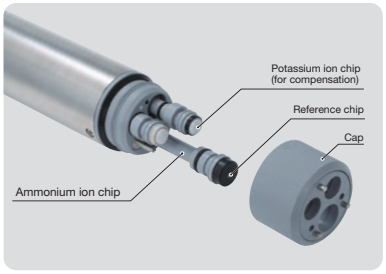
3 Measurment by Horiba ammonia nitrogen meter and evaluation comments from OCWD

For two years, from January 2017 to December 2018, OCWD evaluated the HORIBA ammonia nitrogen sensor. The sensor is designed to be durable and stable for long-term monitoring based on the structure and composition of the ion electrode. It was installed ahead of the microfiltration process and rinsed and wiped once a week as preventive maintenance (Fig 2). The sensor worked without significant drift and consumable electrodes were replaced after one year of use. (Continue to the back side.)

Fig 2. Ammonia meter and ion electrode maintenance.

Mehul Patel, Executive Director of Operations/GWRS, mentioned that “By having an ammonia analyzer and being able to target exactly how much chlorine to add not only makes the process run better but it efficiently allows us to use chlorine. Chlorine is the chemical we use the most of and it costs quite a bit, so we would like to be as accurate as possible. The ammonia analyzer helps us to optimize chlorine usage”.

* The Horiba sensor is currently utilized in the daily operation of the OCWD plant to measure ammonia nitrogen in the MF feedwater (as of March 2019).



Ammonia nitrogen sensor AM-2000

Ammonia nitrogen meter HC-200NH

Ammonia nitrogen meter specifications

Model	HC-200NH
Combination sensor unit model	AM-2000
Measurement range	NH_4-N: 0~1000mg/L (display range: 0~2000mg/L) Temperature: 0~40°C (display range: -10~110°C) pH: 4.0~8.5 Sodium ion concentration is not more than 100 times the ammonium ion concentration
Repeatability	NH_4-N: Larger value between 3%±1 digit of measured value or 0.2mg/L±1 digit (with standard solution) Temperature: ±0.3°C
Potassium ion compensation	Compensation range: Potassium ion concentration is not more than 10 times the ammonium ion concentration and under 1000mg/L Compensation error: ±20% (measured value)

IMS

The HORIBA Group adopts IMS (Integrated Management System) which integrates Quality Management System ISO9001, Environmental Management System ISO14001, and Occupational Health and Safety Management System OHSAS18001.
We have now integrated Business Continuity Management System ISO22301 in order to provide our products and services in a stable manner, even in emergencies.

Please read the operation manual before using this product to assure safe and proper handling of the product.

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