

# RIDGWAY WATER TREATMENT PLANT

## Case Study

**LOCATION:**

Ridgway,  
Pennsylvania

**SOURCE TYPE:**

Surface Water

**CAPACITY:**

2 MGD (7.5 MLD)

**APPLICATION(S):**

Source Water Monitoring,  
Coagulation Optimization,  
DBP Reduction

**PROCESS:**

Conventional Coagulation,  
Flocculation,  
Sedimentation + Filtration

**SYSTEM:**

Real UV254 M3000 Analyzer  
with Dual Feed System and  
Real Clean System



RIDGWAY WTP  
**SAVES**  
**20-30%**  
USING REAL UV254  
ANALYZER



The Ridgway Water Treatment Plant (WTP) in Elk County Pennsylvania uses a Real Tech Real UV254 online analyzer to achieve a 20-30% savings in annual coagulant use in their conventional water treatment process. Equipped with Real Tech's dual-feed feature, the Real UV254 analyzer is used to continuously monitor raw and finished water dissolved organics via a single online analyzer. Beyond operational cost savings, the Real UV254 system helps the WTP consistently produce high quality drinking water for the town's 1700 customers.

**Background**

The Ridgway WTP receives water from a spring-fed source on Big Mill Creek in rural north-central Pennsylvania near the Allegheny National Forest. Raw water from the creek is fed into the 272 million-gallon H.B. Norton Reservoir before being fed to the WTP. From there, the city's 2 MGD (7.5 MLD) conventional coagulation, flocculation, sedimentation treatment process handles treatment. Raw water entering the process is dosed with polyaluminum chloride (PAC) for coagulation and soda ash (sodium carbonate) for pH control. Both gas chlorine and permanganate (KMnO<sub>4</sub>) are also dosed to achieve better organics control in the conventional process. Settled water is then fed to one of five (5) conventional dual-media (sand + anthracite) filters for filtration prior to final stabilization and disinfection before distribution. Overall, the process continues to provide excellent water treatment for its community.

## Improving performance with UV254

Although raw water to the plant is of generally high quality, periodic turbidity spikes and seasonal variation of dissolved organics entering the process have posed operational challenges. Looking for ways to improve performance, Rick McKnight, Ridgway's Water Plant Supervisor, decided to explore UV254 instruments in the summer of 2012. Before starting to monitor UV254, the plant looked at turbidity on the raw water. "We would have high colour in the water that wasn't picked up with turbidity" said McKnight "As a result sometimes we were either over-, or under-dosing coagulant which led to filtration and other operating issues."

Based on his research and many years experience operating the plant, McKnight took a proactive approach by putting data from his Real UV254 field meter into action. After five (5) years of very promising results the WTP installed a dual-feed Real UV254 online analyzer to monitor both raw and settled water in 2017. Now with years of continuous operating data the plant has developed a firm relationship between raw water UV254 and coagulant dose. Being able to monitor organics and adjust their coagulant has made a big impact for the plant.

**"Our coagulant is a fairly expensive part of our operating costs. Now, if we see a good raw water UV254 number, we know we can cut back to save costs. The savings have been pretty significant and we're regularly saving 20-30% on coagulant use throughout the year."**



Figure 1: Ridgway WTP's Real UV254 analyzer measuring both raw and finished water with the dual feed system.

Having UV254 is just as important as turbidity, especially during the summer season and after weather events. "We see events in the summer where UV254 is high from colour and organics, but turbidity stays low" stated McKnight. "It's very important for us to remove organics for disinfection by-product (DBP) formation potential. The two-stream method is perfect for monitoring organics removal, it works great for us and we can consistently achieve really high-quality treated water"

Beyond cost savings, the Real UV254 system has also proven to be easy to operate. "The analyzer is fairly pretty fool-proof," said McKnight, "and we hardly ever do anything to it for maintenance." The ease of operation has meant that newer operators are eager to use the UV254 data as a crucial part of their training and daily operations.

**"The Real UV254 system has been very reliable and easy to operate," said McKnight, "and I would definitely recommend it to other water treatment plants."**

The Ridgway WTP is a prime example of how Real Tech's Real UV254 system can help operators know what's in their water and respond to changing conditions. The ability to understand and adjust coagulant dose in real time not only ensures compliance with even the most stringent DBP regulations, it also saves the Ridgway plant 20-30% in annual operating cost. Overall, the Ridgway WTP is another win-win example of how Real Tech makes online water quality monitoring practical, accurate and affordable.

Delpac settings for changes in water quality

When there are changes in raw water quality, UVA should be run on raw water at startup and changes to the Delpac done immediately

RAW TURB	RAW UVA	DELPAC DIAL	ML/MIN	GAL/HR
50.0	0.360	15.0	400	6.3
20.0	0.345	15.0	400	6.3
15.0	0.340	15.0	400	6.3
14.0	0.335	15.0	400	6.3
13.0	0.330	14.5	390	6.2
12.0	0.325	13.5	380	6.0
11.0	0.300	12.5	340	5.4
10.0	0.275	11.5	325	5.2
9.0	0.250	10.5	295	4.7
8.0	0.225	9.5	265	4.2
7.0	0.200	8.5	235	3.7
6.0	0.175	7.5	210	3.3
5.0	0.150	6.5	170	2.7
4.0	0.100	5.5	140	2.2
3.0	0.075	4.5	110	1.7
2.0	0.050	3.5	85	1.4
1.0	0.040	2.5	60	1.0

  

DIAL	ML/MIN	GAL/HR
15.0	400	6.3
14.0	380	6.0
13.0	360	5.7
12.0	340	5.4
11.5	325	5.2
11.0	308	4.9
10.5	295	4.7
10.0	280	4.4
9.5	265	4.2
9.0	250	3.9
8.5	235	3.7
8.0	220	3.5
7.5	210	3.3
7.0	190	3.0
6.5	170	2.7
6.0	150	2.4
5.5	140	2.2
5.0	130	2.1
4.5	110	1.7
4.0	100	1.6
3.5	85	1.4
3.0	70	1.1
2.5	60	1.0

Figure 2: Operations UV254 dosing table for quick and simple assessment of required coagulant dose.

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