

WTP Filter Retrofit Effectively Improves Performance

CentROL® Filter Upgrade Includes MULTIWASH® Retrofit



CASE STUDY

Location: Webster City, Iowa
Owner: Town of Webster City
Agent: Vessco, Inc.
Contractor: C.L. Carroll Co. Inc.

Problem

The Webster City Water Treatment Plant (WTP) draws water from three wells in the Jordan aquifer, using each one in rotation. This confined aquifer has strict water withdrawal guidelines, and it is crucial that the plant efficiently use and properly manage its water treatment. Because of a hard water issue, the plant uses a lime softening process to remove hardness, iron and manganese. While the plant is currently treating about 1600 gpm, its capacity is 3500 gpm.



The original equipment (installed in 1978) at the municipal plant included:

Total	Name	Size
One	CentROL®	1,600 square feet of filter area
One	CONTRAFLO® solids contact clarifier	54-foot square
One	Aluminum-induced draft aerator	19 feet long, 10 feet-6 inches wide, 11 feet high
One	Sludge thickener	50-foot diameter

The plant has required only a few replacement parts over the years to keep it at operational performance – a significant accomplishment with equipment that has been running for over four decades.

Recently, however, the plant staff identified that the CentROL® filter was showing its age. It was having difficulty maintaining filter runs, sustaining backwash rates, and keeping media within the filter. The plant needed to assess how to upgrade the filter to improve its performance.

Analysis of Alternatives

The original CentROL unit is a conventional gravity filter that has four granular media filter cells positioned around a central distributor column. It was chosen for its compact arrangement and simple operation.

The City had already invested in the framework for the filter and did not want to move to a completely new solution, which would have required it to abandon the plant or construct a new building.



WESTECH®

Solution

In the years since the plant was first installed, WesTech has developed improvements in the CentROL filter design. Now, as a standard feature, all new CentROL filters incorporate the MULTIWASH® backwash process, an enhancement that combines air and water during the entire backwash to maximize filter cleaning efficiency and extend filter run lengths.

The original CentROL filter at the Webster City WTP did not include MULTIWASH. However, a MULTIWASH process retrofit would improve the performance at Webster City, providing a deep clean of the filter bed, prevention of media fouling, long filter runs, and a baffling system around the troughs to prevent media loss.



Webster City moved forward with installing the WesTech MULTIWASH backwash enhancement. The plant's filter runs are now in excess of 100 hours. MULTIWASH also provides a vigorous backwash which efficiently cleans the filter media, eliminating the plant's concern that a water-only backwash would not adequately clean the media. MULTIWASH troughs have low-profile media retaining baffles to help with the plant's media retention.

In addition to the new MULTIWASH troughs and a system air scour, the full upgrade included a new inlet distribution box, new MULTICRETE™ II filter underdrains, and a new filter control panel.

The MULTICRETE II system added a single-slab, monolithic underdrain for incredible underdrain strength. The existing automatic controls, which were original to the first CentROL, were obsolete. As a result, a new control panel was included with the filter upgrade.



Implementation

The implementation challenge at this site was to find a way to first remove the old parts and then to maneuver the new parts into the plant without dismantling the entire building. To solve this issue, a hole was made in the building that was big enough to accommodate the largest pieces, such as the new distribution box. After the work was completed, this hole was turned into a new window for the plant.



Another challenge to installing the washtroughs into the filter cells was working around a concrete beam located in the middle of the cells. The solution was to modify the original washtrough design so the contractor could angle the troughs around the concrete beam.

Results

"We are thrilled with the CentROL upgrade" said Tim Danielson, Webster City WTP Plant Superintendent. "Before we put in the updated CentROL options, we were constantly battling with the filter to try and keep the media in the cells and still perform the backwash necessary for smooth plant operations."

Todd Crawford, Plant Operator, added, "We like that it is easy to operate and no media is lost."

The plant continues to successfully soften the hard water to an acceptable level with the MULTIWASH retrofit. The original hardness of the well water is 400 mg/L, and with the retrofit, the hardness is reduced to 120 mg/L.

Webster City WTP now has a fully-functioning filter that is like new. The City saved money and time by not having to build a new plant, add a new building, or abandon the building they already have.