ITT

Water & Wastewater

Treatment – Clarification

Case Story

Papillion, Nebraska Installs a Leopold® Clari-DAF® BWT System for Treating Filter Backwash Water

Overview

The final EPA Filter Backwash Recycling Rule (FBRR) was promulgated on June 8, 2001. It stated that Utilities with conventional or direct filtration processes were to have State approval for all return recycle flows within their treatment plants. If capital improvements were required to modify the recycle location, they were to be completed by June 8, 2006.

The main objective of the FBRR was to improve performance at filtration plants by reducing the opportunity for recycle practices to adversely affect plant performance in a way that would allow microbes such as Cryptosporidium to pass through into finished drinking water. In addition, residual chemicals and other contaminants in the recycle stream could upset chemical feed processes in the main treatment train process, affecting the coagulation process and contaminant removal in subsequent treatment processes. Recycle streams could also be reintroduced in sufficient volumes to create a hydraulic surge or cause a plant to exceed capacity. All of these issues had the potential to impact finished water quality.

The FBRR applies to all surface water or ground water systems under the direct influence of surface water that practice conventional (coagulation, flocculation, sedimentation, and filtration) or direct filtration (coagulation, flocculation, and filtration), and that recycle water within their process. Filters must be routinely backwashed to maintain proper treatment capability of the filter. The frequency of backwashing and backwash method varies from plant to plant. The backwash process fluidizes the filter media and removes particles that have been trapped within the media. The spent filter backwash contains the removed particles.

Background

The William R. Oliver Water Treatment Plant in Papillion, Nebraska treats an average of four million gallons per day (MGD) with potassium permanganate ($KMnO_4$) and chlorine dioxide (ClO_2) to oxidize dissolved manganese along with Sternpac coagulant and polymer coagulant aid for solids removal in its sand ballasted clarification process. The

The water treatment plant in Papillion.

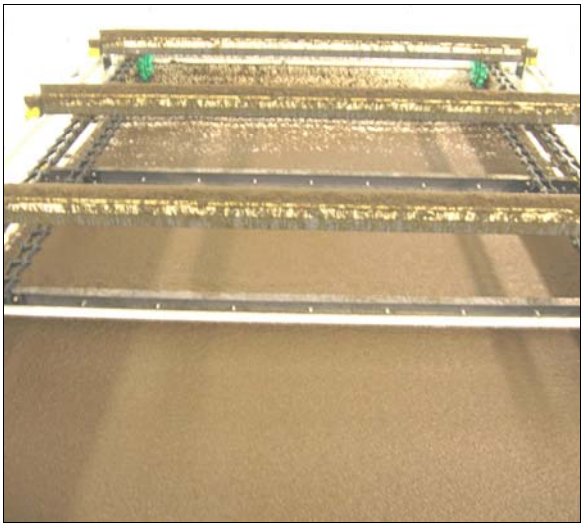
effluent is processed through eight filters, and then stored in a clearwell where chlorine disinfectant is added. The filters have an average run time of 20 hours between backwashes and use air/water in their backwash sequence. Since the water was recycled, plant personnel were required to install a treatment process to prevent potential contaminants from building up in their treatment process. It was decided to install a Clari-DAF® BWT System to treat this stream in order to provide maximum protection of public health, as well as to optimize the treatment processes.

Performance

The Clari-DAF BWT System was designed to handle a maximum flow of 1,310 gpm with one flocculator to provide 12 minutes mixing, a loading rate of 7 gpm/ft^2, and a recycle rate of 10%. Since start-up of the unit, the flow has ranged from a low of 400 gpm to a high of 1,000 gpm. Plant personnel have fed Applied Specialties AS-1430PW acrylamide emulsion polymer at 0.2 mg/L. The influent turbidity has been as high as 800 NTU and the Clari-DAF BWT effluent has been consistently below one NTU.

Clari-DAF system effluent registers below one NTU.

The Clari-DAF system saturator.



The floc blanket on the Clari-DAF system.

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