Water Company Converts to Automated Bulk Bag Discharging of PAC

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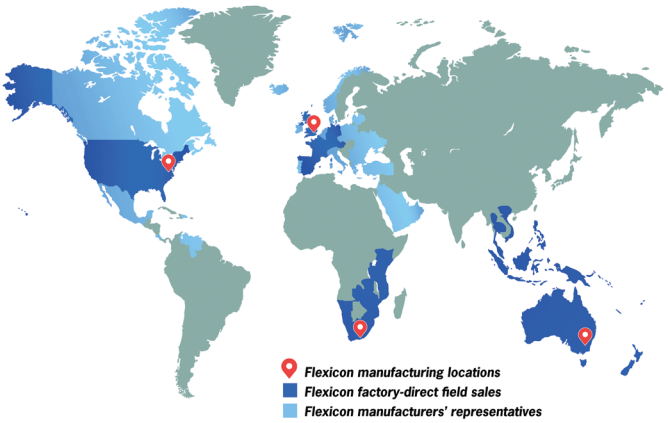

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Water Company Converts to Automated Bulk Bag Discharging of PAC

LAKEWOOD, COLORADO — Consolidated Mutual Water (www.cmwc.net) serves a sprawling suburban area just west of Denver that includes the cities of Lakewood and Wheat Ridge as well as unincorporated areas of Eastern Jefferson County, CO. With approximately 325 mi (523 km) of pipeline, the company supplies water to an estimated population of 85,000 within an area of about 26 sq mi (67 sq km). About two thirds of the water delivered is purchased from the Denver Water Board, with the balance stored in reservoirs and treated at the Maple Grove Water Treatment Plant.

A key step in the water treatment process is the addition of powdered activated carbon (PAC) to adsorb and remove any dissolved organic contaminants that could cause unwanted tastes and odors. “Our operators used to carry 45 lb (20.4 kg) bags up a flight of stairs and manually dump them into the storage hopper above the feeder,” says Chuck Conway, Maple Grove Water Treatment Plant Operator. “It was messy, potentially dangerous and prone to generate dust. The problem became especially severe during periods of peak consumption, when we might have to add as many as 20 bags of PAC per day.”

To solve the problem, Consolidated Mutual Water installed an automated bulk bag discharger system from Flexicon Corporation of Bethlehem, PA. “We now receive PAC in 900 lb (408 kg) bulk bags that we unload with a bulk bag discharger so our operators no longer need to carry them. A secure seal between the bulk bag and the feeder almost completely eliminates dust,” says Conway.

“Our service area, the Front Range of Colorado, is in a climate zone known as the Upper Sonoran Desert, which gets an average of only 15 in. (38 cm) of moisture in the form of rain and snow per year,” Conway explains. “Because bluegrass lawns, gardens and trees must be watered regularly, the summer irrigation season, from May through September, is the prime time for water usage. In fact, the same amount of water is treated and consumed during June through August as during the other 9 months of the year combined.”

“During periods of low demand, one bulk bag may last several days. During peak periods, however, two or three bulk bags per day may be needed.” The amount of PAC added also varies according to the types of organisms producing the unwanted tastes and odors. Some require only a 4 to 5 mg/l (4 to 5 ppm) dose for effective control, while others may require 30 to 40 mg/l (30 to 40 ppm).

After the lifting frame and bulk bag are fastened, an electric hoist and trolley suspended from a cantilevered I-beam lift and position the bag in the discharger frame.

Automated bulk bag discharge system eliminates bottleneck

Since powdered activated carbon is a fine powder with an average particle size of 20 microns and a bulk density of 21.5 lb/cu ft (34.4 kg/cu m), the slightest breeze can spread carbon dust everywhere. By automating the bag discharge process, Consolidated Mutual Water not only eliminated dust and operator safety problems, but also increased efficiency by freeing operators to perform more productive tasks.

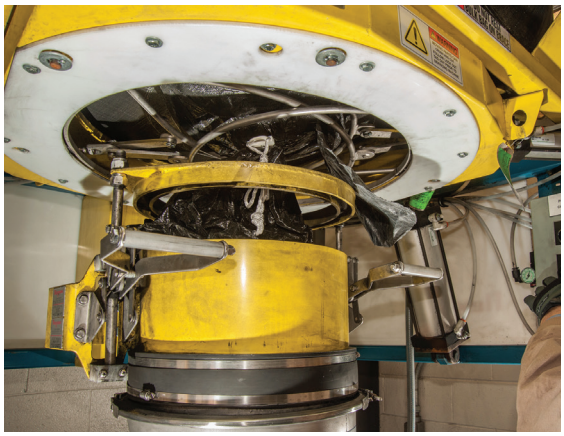
The bulk bags are emptied by a Flexicon BULK-OUT® BFC model discharger, which consists of a rigid frame with a cantilevered I-beam and an electric hoist and trolley. The operator places the bulk bag on the floor from a pallet truck, and activates the electric hoist to insert the bag onto the discharger frame. With the bag secured on the discharger, the operator pulls the bag spout, positioned directly above a twin-screw volumetric feeder, through a POWER-CINCHER® flow control valve that cinches the bag spout.

Below the flow control valve is a manual SPOUT-LOCK® clamp ring that is raised by a TELE-TUBE® telescoping tube for a dust-tight connection to the bag spout. With the connection secure, the operator unties the drawstring and opens the flow control valve to initiate flow. The telescoping tube then lowers, applying continual downward tension to keep the spout taut as the bag empties and elongates. At the same time, FLOW-FLEXER® bag activators raise and lower the bottom edges of the bag, directing material into the outlet spout and raising the bag into a steep "V" shape to promote total discharge system into the volumetric feeder. "The flow control valve remains open the entire time the bag is emptying, with no other valves or controls modulating the flow into the feeder," says Conway.

"We have an inline scale between the bag and the hoist, with a remote readout that allows the operator to ascertain how much PAC remains in the bag to anticipate bag changes. Eventually, we plan to run a signal transmission line into the plant so we can take this reading in the operations control center."

The Maple Grove facility is currently designed to produce up to 15 million gal (56.8 million l) per day, expandable to 18 million gal (68.1 million l) per day. At a treatment rate of 30 mg/l, this requires up to 3750 lb (1700 kg) of PAC daily, while the higher volume will require about 4500 lb (2043 kg). "As the population of our service area continues to increase, we are projecting as many as five bulk bags per day eventually, but our bulk transfer system will be able to handle that easily," says Conway.

The feeder meters PAC into a two-stage tank, where it is mixed with water to form the slurry that feeds the treatment process. "We are currently pumping the slurry at a rate of 15 gal (56.8 l) per minute, but this rate is being evaluated and may change," says Conway.



Operator pulls bag spout through the POWER-CINCHER® control valve, and then onto the SPOUT-LOCK® clamp ring that is raised by a pneumatically powered TELE-TUBE® telescoping tube.

Loaded and flowing: powdered activated carbon flows from the bulk bag to the volumetric feeder and into Consolidated Mutual Water's treatment system.

"The treated water flows to a clarifier where solids settle before being dried and sent to a landfill," Conway explains. "The clarified water is filtered by an advanced ultrafiltration system that removes not only solid particles down to 0.02 microns (0.00000788 in.) in diameter, but also algae, sand, clays, silts and even viruses and bacteria such as Cryptosporidium oocysts and Giardia cysts. The water finally is disinfected with chlorine and distributed to ten storage tanks ranging in capacity from 250,000 gal (946,000 l) to 2.5 million gal (9.5 million l) for a total of 16 million gal (60.56 million l) storage, from which it is distributed to customers."

Extremely fine, dust-prone powdered activated carbon absorbs and removes organic contaminants in the city water that could cause unwanted tastes and odors.

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