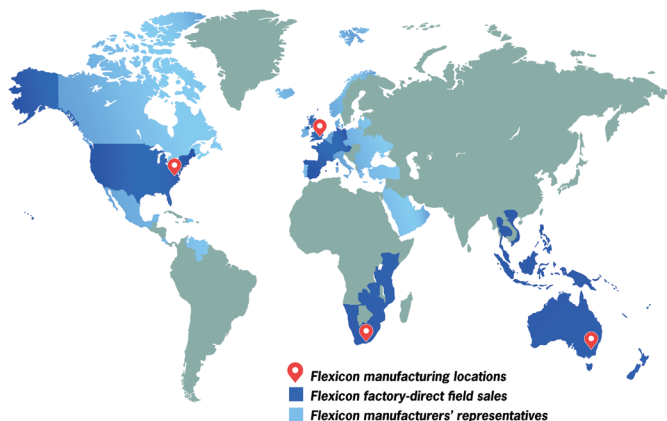




A fork truck holds the bulk bag over the half frame discharger while the flexible screw conveyor moves sodium bicarbonate to the mixing tank.

Weatherable Bulk Bag Discharger Aids Bio-Cleanup Project

HH-0624



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Weatherable Bulk Bag Discharger Aids Bio-Cleanup Project

STRATHAM, NEW HAMPSHIRE — In 2018, bio-remediation specialist XDD Environmental won a contract to design and build a system that treats contaminated groundwater at a New Jersey site. Operating since April 2019, the system pumps water from the ground, adds a variety of amendments to it, and re-injects the treated water into a different area of the site. The treated water promotes the growth of naturally occurring bacteria in the soil, which break down the contaminants.

Sodium bicarbonate is the largest-volume additive. It acts as a pH buffer in the groundwater, which becomes more acidic as the bacteria metabolize the contaminants. “We’re giving the bacteria a better environment so they can thrive,” says Scott Crawford, senior project manager at XDD. “It’s a fairly standard approach.”

What’s not standard is the amount of sodium bicarbonate needed. “Normally, we would take a bulk bag of sodium bicarbonate and manually add it to a mixing tank, but in this case, we had to deliver it in near-continuous fashion,” Crawford says. “There was no way to make those additions manually.” To accomplish the task automatically, the company installed a BULK-OUT® bulk bag discharger from Flexicon Corp.



Specialized screw geometry enables the conveyor to move difficult materials.

Adjustable feeding to go with the flow

Although designed for 24/7 use, the system typically operates one shift per day, five days a week, discharging four to five bulk bags of sodium bicarbonate a day. A 12 in. (300 mm) diameter iris valve controls the flow of bicarbonate from the bag into the discharger’s 8 cu ft (226 l) hopper, which has a displacement vent and filter sock to control dust. At the hopper’s outlet, a 15 ft (4.5 m) long Model 1500 BEV-CON™ flexible screw conveyor elevates the sodium bicarbonate to the 10 ft (3 m) high treatment tank which has an axial mixer to disperse the additions. The conveyor’s screw geometry is designed to handle difficult materials.

A 1.5 hp (1.1 kW) gear drive with variable-speed control rotates the conveyor’s spiral. Variable speed enables the operator to adjust the flow of sodium carbonate to match the flow of water. “We want to feed the bicarbonate at a rate that it can dissolve adequately,” Crawford says.

XDD relied on Flexicon to specify the conveyor’s size and configuration. “We just gave them a target range of how much bicarbonate we needed to deliver per hour,” Crawford says. “On site, we set the right blending ratio, and all we need to do is keep an eye on the bag. When it’s empty, we put a new bag on.” The brief downtime between bags has no impact on the process.

The discharger includes a bag dump station for adding 55 lb (25 kg) bags of trace nutrients. “We like that feature for safety reasons,” Crawford says. “No one has to climb a ladder to the mixing tank, and the hatch and grate at the bag station free the operators from having to balance bags on their knee.”

A simple routine for cleaning

The conveyor can run in reverse to clean the hopper. "We were adamant about that feature because of outdoor humidity and moisture potential," Crawford says. "We didn't want the bicarbonate in the hopper to solidify." To prevent that, the operator at the end of the day opens a fitting at the base of the hopper and reverses rotation of the conveyor spiral, discharging the last few pounds of material. "It's been easy to keep the hopper clean and clear," Crawford says.

On site control, remote monitoring

The operator interfaces with a PLC touchscreen that is attached to the unit. "The operators running the discharger and conveyor have limited experience with any kind of powder handling, so the system needed to be very simple to operate," Crawford says, adding that "the setup is self-explanatory."

The discharger system includes a programmable logic controller (PLC) to communicate with the larger treatment system. If, for example, the proximity level switch senses a low level in the hopper, the conveyor stops. That information is shared system-wide, triggering the pumps and other equipment to pause until the issue is corrected. XDD can monitor the operation from its offices in New Hampshire. "We can log into the system by PLC interface and see what the flow rate is and what the alarm conditions are. If the operators have any issues with the system, they can contact us, and we'll help get them back up and running."

To date, the bulk bag discharger has been trouble-free, Crawford says. "It's very simple and it's been reliable throughout the operation."

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