

## Replacement Vacuum Feeders for Hypo Treatment End Heavy Feeder Maintenance Burden at WWTP



Each of seven replacement units feeds hypo at approximately 800 gpd, into a group of three contact chambers that hold total plant effluent pending discharge. Capacity of each hypo feeder is 10,000 gpd. Major plant revisions are in construction.



Since replacement vendor was able to match exact same previous feeding configuration, installation consisted of fitting the replacement units on the same platform, using the same conduit, and making adjustments to the PVC piping for the inlet and outlet.

The instrumentation supervisor for the City of Baltimore, MD's 150 MGD Back River wastewater treatment plant (WWTP) reports that replacement of problematic vacuum feeders with more advanced vacuum feed units has ended heavy maintenance burdens associated with sodium hypochlorite (hypo) treatment of plant effluent.

"There were too many pieces that could go wrong, and then there were too many meetings with operations and maintenance staff complaining they couldn't get replacement parts," said Prim Rambissoo, who is also responsible for instrumentation at 12 pumping stations and 15 metering stations. "I'm glad we switched to the more advanced vacuum feed units, which we started installing a year ago, and which have yet to require a maintenance call."

Each of seven replacement units feeds hypo at approximately 800 gpd, into a group of three contact chambers that hold total plant effluent pending discharge. An eighth feed unit is being installed, and a ninth is on order. Discharge compliance has continued with the replacement units. Once each shift, chlorine titrations are taken to see if more hypo is needed, with adjustment made accordingly, using the new feeders.

Hypo feed began in 2007, with the original vacuum feed units installed in place of chlorinators and evaporators that had fed chlorine gas that was delivered as liquid in railroad tanks. The switch was made to save material costs, and to avoid the need for burdensome approval for tank-stored chlorine near a residential area.

"Getting replacement parts for the original hypo feed units became a serious problem," Rambissoo recalled. "There was a small company in Florida representing the manufacturer that was located in the United Kingdom, and there were long delays. In particular, there were lots of O-rings getting eaten up, causing leaks, and requiring replacement every few months."

"There were a lot of problems with the internal PVC parts. Hypo would cake up there, and when you tried to move the valve or other moving parts, the gearing would break and cause the valving system to freeze, hindering all controls."

"Any leak required taking the whole unit out of operation," he continued, "and every time that happened,

we had to re-do the piping to the contact chamber. There were certain eductors for certain feeders, so we had to go through a whole process of re-educting. That could take an hour or two for each occurrence, depending on operator availability.”

Rambissoon added that another problem was unit motors loosening up on their shafts, and then twisting beyond reach.

“When that happened, we had to disassemble the entire unit, and put it back together—a big job that took up to a full day,” he said.

“Meanwhile, we could wait over a year to get parts, and when it was O-rings, they sometimes wouldn’t fit. As a result, we started going to local hardware stores to get the replacement O-rings we needed.”

Metering pumps were mentioned as replacements, but were regarded as too costly to install and re-pipe to the contact chambers.

“Then I started searching for an alternative vacuum feeder manufacturer that was U.S.-based,” he said. “I found one, but their units were way too complicated, with too many features that we couldn’t use. But then I found an alternative vendor that was able to match the exact same configuration we already had. We just needed to fit the replacement units on the same platform, using the same conduit, and make adjustments to the PVC piping for the inlet and outlet.”

“Installation was easy, taking only a day for each unit. The units have a built-in electronic flow meter, with digital display, that makes operation so much easier than before. The previous units had a sight glass that was difficult to read at times.”

Rambissoon said that in the near future, three smaller replacement units will be added to feed sodium bisulfite. They will feed approximately 300 GPD each.

“Even though the bisulfite units had been holding up better, we’d rather not have to worry about getting parts and being down for repairs,” he noted.

The JCS Industries chemical feeders used at the Baltimore WWTP, capacity 10,000 gpd each, utilize real-time feed information via electronic flow sensors that allow for continuous monitoring and control of the chemical feed rates. “We currently use our feeders in fixed mode, but maybe in the future, we may go to automatic mode,” Rambissoon added.

Each feeder automatically regulates in both fixed and variable control modes, including fixed feed rate, flow paced, residual control, and compound loop. The feeder system can dose a variety of aqueous chemicals commonly used in municipal and industrial water treatment systems.

The feeder system is comprised of a vacuum injector to safely introduce the liquid into the feed-water stream; a reversing servo motor coupled with a V-notch valve to regulate the



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chemical feed rate; an electronic flow sensor to monitor and regulate the feed rate; and a control module for complete electronic control and communications.

A plant’s water flow rate and/or a chemical residual signal are used to adjust the chemical liquid flow rate by electronically positioning the servomotor driving the feed control valve. The ratio of input signal to liquid flow is adjustable over a range of 5% to 400% to enable increased liquid feed in response to additional chemical demand.

US Patents have been received for the all-vacuum liquid feeder, which can dose up to 60,000 gal/day.

For further information, contact JCS Industries, 5055 FM 2920, Spring, TX 77388, Tel. 281-353-2100, Fax 281-353-0657, sales@jcsindustries.us.com, www.jcsindustries.us.com.

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