



## **Safety And Value With Vacuum Chemical Feed**

In 1998 the State of Texas implemented the USEPA rules regarding the storage of water treatment chemicals. This program was called the Risk Management Program (RMP). The chemical that had the biggest operational concern was chlorine gas due to the potential for ESH hazards.

Cypress Klein Utility District (CKUD) is a municipal political entity located 25 miles north west of Houston, Texas in Harris County. CKUD provides water and waste needs for approximately 3,500 residents through two 1,500 GPM water wells and a centralized waste treatment facility designed for 0.650 MGD with current daily flows of 0.400 MGD.

CKUD, though with some design changes and inventory modifications, could have fallen below the lower limits of the chlorine requirements in the RMP, but after exhaustive studies into economic and technical alternatives, the district decided to remove chlorine gas and to install a safer, and more economical, approach to effluent disinfection at the wastewater treatment facility. The reasons for this decision were the close proximity of residential dwellings and public/ private parks to the facilities. The wastewater plant, for example, was using ton cylinders and was bordered on one side by a county park and on the other by the Barbara Bush library.

It was determined by operations and engineering staff that the quickest and most economical process change was to change from chlorine gas to feeding 10-12.5% sodium hypochlorite. Within 30 days, the facility was converted to liquid feed, complete with a storage tank and flow proportional metering pumps. Almost immediately, the metering pumps started losing prime due to off gassing and clogging in the pump orifices. After 3 months of ongoing pump feed issues, a new technology was employed. Two rotameter based vacuum feed dosers, similar to those used in gas dosing, were installed to feed the bleach. These units were expected to provide more reliability, added safety and enhanced control. A cationic ion exchange unit, or water softener, was also installed to protect the solution injectors from calcium buildup from the motive water.

After several months of operation the following observations were made. (1) Though more reliable than the metering pumps, the new dosers occasionally failed due to fouling of the metering orifice by the disinfection chemical or, at low feed, something as simple as the surface tension of an air bubble caused the feeder to lock up. (2) A more critical problem was the lack of a failure notification. Operations personnel felt that it was imperative that the feed system should provide an immediate alarm when a failure occurred.

After consulting with local chemical feed service and sales companies in the area, Reliant Water Technologies was asked to install their Model 4100 liquid vacuum feeders in place of the rotameter vacuum dosers. Immediately, advantages of the Reliant vacuum feed control system were apparent –

- An electronic magnetic flow meter was used to measure and feed the required bleach. Such a precise measurement system allowed for the electronic control system to provide +/- 2% accuracy, continuously.

- The analog feedback of the precision metering system was only one of many parameters within the controller that could initiate an alarm should some fault occur.
- The feeder is self-adjusting for effluent flow control, and since there is a feed back signal of the actual feed rate, and chlorine residual, it employs circuitry that will alert operations personnel immediately of a high, low or no feed situation.

The Reliant Model 4100 chemical feed controllers have now been operating without issue for two years. Due to the success with the Reliant feeders, CKUD has decided to retrofit the two ground water facilities to the Reliant Model 4100 feeders as well.



**Reliant Water Technologies wastewater chemical disinfection feed system with built-in automatic injector switchover controller and secondary feeder**