Municipalities Are Focusing On The Reliability Of Their Lift Station Backup Plans

An increasing number of utilities are replacing traditional backup generators with independently powered backup pump stations.

BY STEPHANIE E. MORGAN

With the increasing regulatory enforcement for sanitary sewer overflows (SSOs), more municipalities have been forced to ask themselves: how reliable is my lift station backup plan? In an effort to avoid SSOs, schedule preventive maintenance, and allow for future growth, an increasing number of utilities are replacing traditional backup generators with independently powered backup pump stations.

Traditional lift station design has, for decades, included backup diesel generators to power submersible electric sewage pumps that are rated for both normal and peak demands. Typically, when a power outage occurs, the main control transfers power to the diesel generator, which then directs power via a transfer switch to a breaker panel controlling the pumps. If there are no failures in the generator, transfer switch, pump controls, or with the electric submersible pumps themselves, lift station operation will continue uninterrupted. If, however, any of these components fail, the outage duration, prevailing flow, and surcharge capabilities of the gravity sewer lines feeding the station could result in an SSO.

The city of Boynton Beach, FL, purchased this Godwin Dri-Prime Backup System (DBS) unit to provide continuous pumping, particularly throughout the storm season.

Vulnerability Takes Its Toll

The vulnerability of this type of electric power-dependent pumping took its toll on Boynton Beach, FL, in October 2005 when Hurricane Wilma left the entire region without power.

"During Wilma, we lost power at all of our stations," said Boynton Beach Deputy Director of Utilities Pete Mazzella. "We didn't have the manpower to monitor all of those stations when that happened, so we were looking for something that didn't rely on utility power."

Mazzella is one of many utility directors who have made the switch to backup pumping.

"The municipalities we serve are aware of the increased sophistication of temporary bypass pumps. Because of our experience with both temporary and permanent pump applications, we are working to educate the masses that the same pumps that pull their weight during bypass applications can serve an equal and effective purpose for permanent backup pumping," said Godwin Pumps President John Michael Paz.

Unlike using a generator backup that can fail if there is a problem with the transfer switch or electric submersible pumps, a self-priming backup pump provides simplicity because the automatic self-priming pumpset is a stand-alone unit that operates on diesel or natural gas power. Using automatic start and stop controls via a pressure transducer or float switches located in the wet well, the pump is activated when the sewage level in the wet well rises to a predetermined height. The self-priming pump uses a venturi to remove air from the suction line, creating a vacuum that allows the sewage to rise, which then primes the pump. The backup pump continues to operate and pump the required flow, then shuts off when either the wet well is lowered or the electricity is restored and the primary system restores control. The net effect is that the emergency backup pumping system and the lift station pump system are separate, independent, and do not rely upon each other.

A Number Of Benefits

The immediate and obvious benefit of continuous pumping is that SSOs can be avoided. Some of the additional benefits include enabling routine maintenance during downtime, offering extra pumping capacity during periods of excessive flow, providing for peak shaving (that is, switching from electric power to diesel power to avoid peak power costs), and continuing pumping during mandatory rolling brownouts.

In addition, a simple comparison of traditional lift station backup power versus the new method of lift station backup pumping reiterates that:

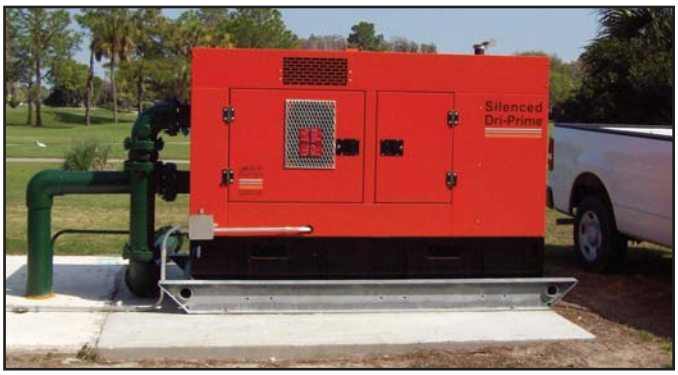
- Failure can occur with city power, the transfer switch, the control panel, or with the electric submersible pumps, in which case standby generators that create electrical power are rendered useless (and are themselves vulnerable to failure).
- Backup pumping provides increased flexibility to perform repairs or preventive maintenance on permanently installed pumps, reducing repair or replacement costs associated with unplanned failure.
- Initial and ongoing costs are greater with generators. A diesel generator and transfer switch can cost between five and 10 thousand dollars more than a diesel backup pump.

Generators are usually load tested on an annual basis to ensure reliable power generation in emergency situations. The costs associated with load testing generators are significantly higher than those associated with flow testing an automatic priming emergency backup pump.

To satisfy local requirements, contract electricians are often called upon to load test generators and can be the only qualified personnel able to work on a generator in the event of failure. Flow testing automatic priming emergency backup pumps is routinely handled by operators at no appreciable cost.

Pasco County (FL) Utilities Services Branch (PCUSB) experienced a population explosion and system demand requirement that was disproportionate to its staffing and ability to perform preventive maintenance on its lift stations. The result was an agreement between PCUSB and the Florida Department of Environmental Protection (FDEP). Taking advantage of an in-kind benefit program, PCUSB implemented standby pumping to both mitigate the possibility of future SSOs and to provide a reasonable amount of time for primary lift station maintenance and repair.

Working with CH2M Hill, Pasco County determined the most environmentally sensitive areas containing lift stations throughout the county and ranked them according to ideal installation possibilities. CH2M Hill and Pasco County preselected three pumps that covered the range of flow and solids handling variables required, while assuring project compliance and feasibility of pump delivery within the required installation period.



Forty-one Godwin Dri-Prime Backup System (DBS) units have been installed throughout Pasco County, FL, to protect environmentally sensitive areas.

Bridgeport, NJ-based Godwin Pumps provided 41 of its Dri-Prime Backup System (DBS) pumping stations, including its three-inch CD80M, four-inch CD103M, and six-inch CD150M pumps in critically silenced DBS enclosures. With pumping capacities from 350 to 1,700 gallons per minute (GPM), these DBS pumps handle solids from 1 5/8 inches to 3 inches in diameter and are automatic priming to 28 feet using the Dri-Prime automatic priming system with no moving parts and simple maintenance.

Using the Godwin PrimeGuard Controller, PCUSB customers can rely on these DBS backup pumping stations to automatically start and stop the pumps without operator intervention. Once started, the PrimeGuard Controllers work to auto-throttle the engine in an effort to meet the flow requirements without overburdening the pump or engine, thereby increasing the longevity of the pump and efficiency of the engine.

"When we responded to this bid, we knew we had the range of pumps and that we could meet the delivery schedule," said Paz. "More importantly, we knew that the county was making the best decision to protect its environmentally sensitive areas. It just makes sense to back up your pumps with another pump. They have gone to great lengths to choose the most efficient pumps and prioritize the most sensitive areas, and we think that this level of preparation will result in a better defense against unforeseen events." ■

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