TALKING POINTS:

Asset Management & Energy Conservation In Your Water & Wastewater Facilities

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By Design
TALKING POINTS

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Inside this issue:

Bolton & Menk's Water & Wastewater Group provides services in the areas of:

- Water Supply & Treatment
- Wastewater Collection & Treatment
- Industrial Waste Treatment

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Asset Management - An Essential Tool for Water and Wastewater Utilities

A properly developed asset management program provides an essential planning tool for water and wastewater utilities to evaluate the current state of their facilities and for financing future improvements. By defining a level of service and implementing an effective asset management program, a utility can maximize the use of existing resources while prioritizing which resources are most critical to provide reliable service at the lowest life cycle cost.

All water and wastewater systems are made up of valuable assets. These are the physical components of the system and can include pipes, valves, tanks, pumps, wells, treatment facilities, and any other components that make up the system. The assets that make up a water or wastewater system generally lose value over time as the system ages and becomes more difficult to maintain. Along with aging facilities, it may be more difficult to deliver the type of service that customers expect from their utility. Costs of operation and maintenance will increase as the assets age. Eventually, the utility may be faced with excessive costs that it can no longer afford.

An asset management approach can assist the utility with making better decisions on managing these aging assets. The goal of asset management is meeting a required level of service in the most cost effective way through the creation, operation, maintenance, and rehabilitation of assets to provide for present and future customers.

Bolton & Menk, Inc. can assist you in properly developing an asset management program that will serve as an essential planning tool to provide reliable service at the lowest life cycle cost for your water and wastewater utilities.

Please contact Greg Johnson at 651-704-9970 or email gregjo@bolton-menk.com for more information.

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Reduce Energy Costs and Extend Equipment Life with VFDs

A variable-frequency drive (VFD) is an electronic controller that adjusts the speed of an electric motor by modulating the power being delivered. VFDs provide continuous control, matching motor speed to the specific demands of the work being performed. VFDs are an excellent choice for adjustable-speed drive applications because they allow water and wastewater operators to fine-tune processes while reducing costs for energy and equipment maintenance.

VFDs are rapidly gaining popularity at water and wastewater treatment facilities, where the greatest energy draw comes from pumping and aeration—two applications particularly suited to VFDs. For applications where flow requirements vary, mechanical devices such as flow-restricting valves or moveable air vanes are often used to control flow, which is similar to driving a car at full throttle while using the brake to control speed. This process uses excessive energy and may reduce the life span of mechanical equipment. VFDs enable pumps to accommodate fluctuating demand, running pumps at lower speeds and drawing less energy while still meeting pumping needs.

VFDs are commonly used with three-phase electric motors, so existing pumps and blowers that use throttling devices can be retrofitted with these controls. VFDs can also be specified for new equipment. Single-speed drives start motors abruptly, subjecting the motor to high torque and current surges up to 10 times the full-load current. In contrast, VFDs offer a "soft start" capability, gradually ramping up a motor to operating speed. This lessens mechanical and electrical stress on the motor system and can reduce maintenance and repair costs and extend motor life.

VFDs allow more precise control of processes such as water distribution, aeration and chemical feed. Pressure in water distribution systems can be maintained to closer tolerances. Wastewater treatment plants can consistently maintain desired dissolved oxygen concentrations over a wide range of flow and biological loading conditions by using automated controls to link dissolved oxygen sensors to variable-frequency drives on the aeration blowers.

Energy savings from VFDs can be significant. Affinity laws for centrifugal pumps suggest that even a small reduction in motor speed will highly leverage your energy savings. VFDs can reduce a pump's energy use by as much as 50 percent in some applications. A VFD controlling a pump motor that usually runs less than full speed can substantially reduce energy consumption over a motor running at constant speed for the same period. Because this benefit varies depending on system variables such as pump size, load profile, amount of static head, and friction, it is important to calculate the benefits for each application before specifying a variable-frequency drive.

Savings from reduced maintenance and longer equipment life after a VFD is installed contribute significantly to achieving a rapid payback and long-term savings. Many electric utilities offer financial incentives that can reduce the installed costs of variable-frequency drive. However, demand charges may not be lowered with a VFD since demand charges are calculated by some utilities as the average energy usage over a period, typically 15 minutes. The energy required is the same regardless of whether the VFD is installed; therefore, there are no utility demand cost savings.

VFDs are more reliable today, easy to operate, increase the degree of flow control, and reduce pump noise. Because of the nature of this technology, VFDs can produce harmonic distortion—adversely affecting power quality, and subsequently, other electrical equipment. However, manufacturers have developed many solutions to correct this problem. For example, installing an isolation transformer in conjunction with the VFD can reduce distortion to an inconsequential level.

To learn how VFDs can reduce your energy costs and be implemented at your water and wastewater facilities please contact Greg Johnson at 651-704-9970 or email gregjo@bolton-menk.com

Featured Project: Saint Peter Water Treatment Plant

The City of Saint Peter retained the services of Bolton & Menk, Inc. to evaluate, design and provide construction management services to build two state of the art water treatment facilities. The goals for the new facilities were to meet existing needs, accommodate future growth, and meet drinking water quality standards to provide a safe drinking water supply to the residents of Saint Peter.

After various water source alternatives, water treatment alternatives and sites were evaluated, a new filtration facility and well field were recommended. The new facility, located on Broadway Avenue, along with the rehabilitated St. Julien facility, is sized to meet demands and growth for the next 20 years. The Broadway facility is also designed to allow for expansion should additional capacity be needed.

The facilities, with a combined capacity of over 3,000 gpm, were designed to remove iron, manganese, nitrates, radium, chloride, sulfates, and other total dissolved solids resulting in softer water. The new facility also chlorinates and fluoridates the water to enhance public health. The process utilizes gravity sand filtration, as well as the latest reverse osmosis (RO) membrane technology to treat the City's drinking water and provide one of the upper Midwest's best water qualities.

The City selected the RO membrane process to refine their drinking water to a very high quality. The City also incorporated a unique 3-stage RO system to increase water recovery ultimately in order to waste less water and still meet treatment objectives of removing unwanted contaminants. This facility incorporates new ground water wells in three different aquifers, aeration, detention, and gravity filtration for iron, manganese, and radium removal. These processes are then followed up by the RO membrane technology and a blending system to accomplish the desired water quality goals of the City. The new facilities included a 2,100 gpm gravity filtration system, 1,800 gpm and 1,200 gpm RO membranes at two locations, offices, lab, and large garage/shop.

Construction is close to completion and successful start-ups on both facilities occurred in March and August of 2011.