FluxDrive Reduces Power Costs by $30,000.00/yr At SPI Mill

Steve Manwell, PumpTech Bellevue

Sierra Pacific Industries is a third generation, family owned forest products company based in Anderson, California. It owns and manages nearly 1.9 million acres of timberland in California and Washington and is the second largest lumber producer in the US. In addition to its timberland, it owns and operates ten sawmills in CA, six of which provide cogeneration. Up here in WA, it has sawmills in Aberdeen, Burlington and Centralia. The Burlington and Aberdeen facilities cogenerate power for the grid while Centralia generates power for its own use.

In 2013, the Centralia mill installed a FluxDrive adjustable speed drive on their boiler’s 200 HP, induced draft fan. The FluxDrive solved two major issues and reduced electrical costs substantially. The photo above shows Cogen Superintendent, John Gardner standing next to the installation.

Centralia had two major problems with the existing system. The first was belt fan. The FluxDrive solved two major issues and reduced electrical costs substantially. The photo above shows Cogen Superintendent, John Gardner standing next to the installation.

Cheyne Landfill - Hydronix Packaged Irrigation System

Ed Smith, PumpTech Moses Lake
Jim Joyce, PumpTech Bellevue

The Cheyne Landfill, located north of Zillah, WA, was designed for both liquid and dried biosolids and incorporates lined septic lagoons. The on-site, irrigation well was contaminated due to the waste products in the landfill. Originally, water from this well was used to irrigate the active areas of the landfill and city water was used in other areas. Now, the contaminated well supplies a Hydronix 700 Series packaged system that includes both booster pumps and a tablet chlorinator. This system sanitizes the non-potable water and provides pressurized flow for irrigation in the areas surrounding the landfill. The system eliminated the need for any city water for irrigation at the facility.

Cheyne continues on Page 4
Late last year PumpTech and Jorge Cortes of Morrison Pump did a start up on four Morrison axial flow pumps at the Rock Creek WWTP in Hillsboro. These pumps were part of an upgrade to the plant and are used to pump finished effluent to the outfall. They complement two existing Morrison pumps that are used to pump mixed liquor. The picture below shows the pumps in operation.

The two pumps to the left of the picture are 20", 75 HP units designed for variable speed flows of 4500 GPM to 8500 GPM at heads of 9 ft to 26 ft. The tested hydraulic efficiency is 87%. The two on the right are 24", 200 HP units designed for variable speed flows of 7600 GPM to 15250 GPM at head of 10 ft to 38 ft. Their tested hydraulic efficiency is 90%. The high efficiencies was one of the reasons Corollo Engineers selected Morrison for this project.

The photos at the bottom left and above are other views of the installation. The one below shows one of the pumps during installation. Installation was done by PEK Construction.

PumpTech is currently working on two more Morrison projects that will install in Washington and Oregon. One includes two 48" flood control pumps for the city of Tacoma which will go out to bid this spring. The other involves four 24", 40 HP pumps for the Corps of Engineers. These very low head pumps (4.6 ft) will run at 395 RPM via a right angle gear drive and will produce a flow of 18700 GPM at 87.5% hydraulic efficiency. They will be installed at Foster Dam in Sweet Home and will be used to pump water from the tailrace to the fish ladder pool. CH2M Hill did the design and Natt McDougall Company will provide the installation. Installation is scheduled for late February.

In late 2011 PumpTech did a start up on three Morrison pumps at the mouth of the Elwha river. These 300 HP, 70000 GPM pumps provided flood control for the Klallam Indian tribe. If you would like to read more, download the Winter 2012 newsletter from the “Resources” page at PumpTechnw.com.

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slippage during across the line starting. This was causing shortened belt and sheave life. In order to eliminate slippage they had to over tighten the drive belts and this caused the second problem. The higher belt tension increased the bearing load which gave rise to premature bearing failure.

So, how did FluxDrive solve these problems? The photo below shows a FluxDrive belt drive coupling. It consists of an outer can that is lined with rare earth, permanent magnets and is directly connected to the sheave that drives the load. Inside the can is an induction rotor that is directly connected to the motor shaft. There is a small air gap between the can and rotor. When the motor starts, the magnets inside the stationary can induce a magnetic field in the rotor. The field that builds up in the rotor opposes the field that created it and the torque that arises from this interaction causes the can to turn in the same direction as the rotor. During starting, the air gap causes a significant amount of slip between the can and rotor. This provides a cushioned start that allows the motor to accelerate to full speed while the driven machine reaches full speed more slowly. This cushioned start eliminated belt slippage and the reduced belt tension preserved bearing life. Once the motor reaches full speed, the slip between the can and the rotor is reduced to about 1.5%.

So, how did the FluxDrive reduce energy consumption by 550,000 kWh per year? Balanced draft boiler designs can utilize two types of fans. A forced draft (FD) fan delivers combustion air to the furnace. An induced draft (ID) fan reduces the atmospheric pressure in the boiler and forces flue gases into and out of the stack. The 200 HP, induced draft fan was designed to provide air flow when the boiler is under full load. There are, however, many times during the day when full load is not required and the boiler operates at a much lower load. During these periods, the fan would still operate at full speed and electrical power was wasted.

A unique feature of the FluxDrive coupling is that the overlap of the magnetic can and induction rotor can be varied. Reducing the overlap reduces the magnetic interaction between the two and therefore increases the slip. Increased slip reduces the speed of the fan and the power required for operation. This adjustable speed operation can be performed manually or in real time via a servo mechanism. The Centralia FluxDrive operates on a 4 - 20 ma signal that controls fan speed based on boiler load. The photo below shows the drive servo installed on the FluxDrive coupling.

Test results show that the ID fan draws 98 kW at full speed and just 35 kW at 50% drive overlap. This resulted in a power savings of approximately $30,000 per year. After the utility incentive, the pay back for the cost of the FluxDrive and installation was less than six months.

Sierra Pacific has been a valued customer of PumpTech for more than four years and we believe that there are several other applications that can benefit from FluxDrive couplings. Sierra Pacific also utilize our Grundfos C series multistage pumps in their boiler applications and Vaughan Choppers eliminate plugging in their storm water sumps.
Nathan Stark & Ed Smith, PumpTech Moses Lake

The town of Chewelah, Washington, located in the Colville river valley about 50 miles north of Spokane, installed a new lift station in 2006. Like many other small towns, they were having plugging problems due to the make up of their wastewater and the new "flushable" items that enter the wastewater stream. This tends to be a more frequent problem for smaller communities due to lower flow rates and the smaller pumps that are required. In most cases a 4" pump is the largest that can be accommodated.

By 2012, they were having to pull the pumps an average of six times per month which was a drain on their resources. In the fall of 2012, Robin Hegney got in touch with PumpTech to see if we could offer a solution. After evaluation of the system it was determined that a small non-clog could not handle the solids content. We suggested replacing the existing pumps with 5 HP, Vaughan choppers which could be adapted to their existing rail system. The Vaughan choppers were installed in May of 2013 and have had no plugging issues. The pictures show the small wet well and one of the pumps during installation.

Chewelah was founded in 1873 by Thomas and Mary Brown and was incorporated in 1903. The name comes from the Indian word “Sche wee leh ee” which means water snake. Supposedly there was a spring on the SW side of town where the motion of the water gave the illusion of swimming snakes.

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The Hydronix 700 Series booster system included a variable speed, Grundfos Boosterpaq; valves; gauges; transducers; hydropneumatic tank; the associated piping and a UL 508 NEMA 4 panel. Additional features included a 25 lb, dry tablet chlorination system and a 30 gallon solution tank. All of the components were installed in our Hydronix “Gull Wing” fiberglass enclosure. The photos to the left and below show the enclosure with the gull wings open and the interior of the system.

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In February, PumpTech introduced a new, no cost, service for our current and potential customers. We are offering to assist in energy audits of potentially problematic pumping applications. Its purpose is to evaluate actual pump performance and suggest potential changes that could reduce energy consumption. In addition to energy savings, maintenance costs will also be reduced when pumps operate at or near BEP. Motor testing is also performed in order to detect unacceptable phase unbalance which can substantially reduce motor life.

The figure on the right shows the cost of off BEP pump operation. This application was designed to run 8 hours per day and provide 900 GPM @ 130 feet of head. Unfortunately the system curve was miscalculated and the pump runs at 750 GPM @ 147 feet of head. In order to meet the daily flow requirement, it now runs 9.5 hours and hydraulic efficiency is reduced by 10%. The cost per thousand gallons pumped increases from 5.1 cents to 6.5 cents and the annual energy cost increased by $2300.00. Off BEP operation can be caused by an inaccurate system curve or changes in downstream system conditions.

The figure below is a partial screen shot of our field test spreadsheet. It is designed to test end suction & split case pumps, submersible wastewater pumps and lineshaft turbines. It provides all of the calculations required for comprehensive testing of both pumps and motors. Some of the calculations include BHP, pump efficiency, voltage & current unbalance and the cost per thousand gallons pumped. It will also plot a performance curve when multiple points are tested. If you would like PumpTech to assist you in an energy audit or pump test, contact your regional salesperson.
More On Constant-Chlor Calcium Hypochlorite Disinfection Systems

Jim Joyce, PumpTech Bellevue

In our Summer 2013 edition of Pipeline we introduced our new line of dry briquette feeders that use a patented spray technology to maintain a consistent concentration of hypochlorite solution.

There are several aspects to consider when choosing a feeder. Most relate to the ease of use but, safety and long term chemical stability are two other factors to consider as well. The Constant Chlor briquettes are shipped in 50 lb, sealed plastic pails and have a very long shelf life. They are also very hard so they create very little dust. This makes filling easy as they can be poured directly into the feeder storage tank. Because the chlorine concentration of the briquettes is 65%, they require a lot less storage space than liquid bleach. When handling the briquettes there are no liquids to spill so handling is safe and simple. Unlike sodium hypochlorite solutions, which degrade over a short time (see chart), the Constant Chlor system creates hypochlorite solution only as it is needed. This allows the solution strength to remain very stable and repeatable. For more information on our Constant Chlor line, contact your local PumpTech branch.

Canby Manufacturing - Hydronix & MeterMan

Our Canby manufacturing facility has been busy building pump skids. The picture below shows one of two skids being built for Astoria Energy in New York. They feature 24" Peerless end suction pumps powered by 700 HP TEFC motors. They will be pumping cooling water at the generating facility.

The two photos to the right are part of the 99 skid order that PumpTech built for a new food processing facility in Oregon. The one under construction is a large Vaughan Chopper pump used to transport food waste. The ones above are Cornell clean water pumps. Other skids provided for this job include Cornell food pumps and SIHI multistage pumps. All of the baseplates and coupling guards are welded 304 stainless steel. Good job Canby!
As I read the various articles within the newsletter I appreciate the new and inventive ways the PumpTech sales, service, engineering and manufacturing teams regularly bring benefits to our customers. Examples of energy savings, reduced maintenance man hours, reduced downtime and environmental improvements as well as operational improvement are all in our winter newsletter.

Working collaboratively with Municipal and Industrial customers, we consistently provide cost effective solutions to complex performance problems. Energy auditing of pump stations is a simple way to determine if a station’s performance, longevity or energy usage can be improved. As it was recently said at our annual sales meeting, “you don’t know what you don’t know”. On page 8 of this newsletter you will see a list of events at which PumpTech will be exhibiting and presenting our educational seminars. If you are interested in learning more about energy audits or in field pump testing please stop by our booth. We will be presenting our seminar on “Testing Pumps & Motors in the Field” in Spokane and Lynwood, WA and Eugene, Oregon City and Baker City, OR this winter and through the spring and summer.

The PumpTech team would welcome the opportunity of working with you on your next project, energy audit or maintenance challenge. Thanks for taking the time to read our newsletter.

Doug Davidson, PumpTech Bellevue

Hellos & Goodbyes At PumpTech

Shawna Andrews joined the Canby sales team in October of last year. She will be managing the industrial sector in OR and Southern WA. She will also have some municipal responsibilities. Before joining PumpTech, Shawna was the NE Regional Sales Manager for Verder.

Toni Gilmore joined the PumpTech, Project Management team in January. She will help coordinate our Packaged Systems projects that are built in Canby. Toni comes to us after a ten year career with Pioneer Pump.

Merlin Hill joined PumpTech, Canby in October as our newest service technician. Prior to joining PumpTech, he was in the Navy where he worked with pumps, compressors and heat exchangers. After the Navy he moved to Mt. Hood where he worked as a snowboard instructor.

Daniel Holloway joined PumpTech Canby in October of last year as our new Shipping & Receiving Manager. He has over seven years of experience in various industries. Dan will also be assisting our shop personnel in various duties.

Zach Weeks joined the Bellevue branch in September of last year as our Outside Engineering salesman. He has a degree in Environmental Engineering and worked as a consulting engineer in Austin and Houston. His specialty was the design of water and wastewater pump stations and treatment plants.

Bob Rosentreter retired from PumpTech in February after ten years of employment. He was the Purchasing Manager for our Canby branch and coordinated the purchase and delivery of all of the components used in our packaged systems.
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3/11-13 Western Boiler Conference - Port Angeles
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3/25-27 ORWEF Short School - Oregon City
3/31-4/2 Eastern OR Short School - Baker City
4/10-11 WASWD Spring Conference - Yakima
4/17   ASCE Seminar - Yakima
5/7-9   PNWS-AWWA - Eugene
6/3-4   Western WA Short School - Lynnwood

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