



Serving the Pacific Northwest

# PumpTech Pipeline

Providing Knowledgeable Solutions

## iRover Mobile HMI Goes Beyond Onsite Mobility

Chris Suskie, Canby

It's hard to believe that iRover Mobile HMI has been available for almost a year now. We have had several successes such as our Beta site at the City of Scappoose WWTP. They are using iRover's onsite mobility feature to access and control their filter feed station. The filter feed station control panel is mounted outside and directly into the sun which renders the touch screen virtually useless. iRover Mobile HMI has changed the way the City of Scappoose views and controls their filter feed station, making the operators job much more efficient. By



choosing the onsite mobility option with a dedicated WIFI router, the City was able to solve their problem without going overboard with options they would never use.



But...what if onsite mobility wasn't enough? What if your problem reading the touch screen wasn't caused by sunlight washing it out but rather that you were over 100 miles away on another job site? What then?

I'm happy to assure you that we have now overcome such a problem through the use of 3G technology. After several months of in house testing, we have finally installed the first 3G wireless router in the field for

[iRover](#) continues on [Page 3](#)

## Westwood Lift Stations - Cheney, WA

Ed Smith, Moses Lake

The residents of the City of Cheney approved a bond measure that enabled the construction of a new middle school on the east side of their district that will better serve the families in the growing west plains. The project required two lift stations that would accommodate both wastewater and stormwater flow. The picture on the right shows both stations after installation and start up.

PumpTech's Moses Lake branch worked with Mike Morse of Taylor Engineers during the design phase of the lift stations. The city of Spokane also had input on the equipment

selection as they will maintain both systems. PumpTech provided detailed specifications and drawings for our Hydronix model 421, UL listed submersible lift stations



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## City Of Pasco Selects Sulzer - ABS HST Blowers For WWTP

Jim Joyce, PumpTech Bellevue

For several years the City of Pasco WWTP searched for ways to reduce the energy being consumed by the blowers in their aeration system. Several techniques were tried but regulating the air flow through the

existing blowers proved difficult and costly. Part of the problem was the air demand was higher than one blower could provide but too low for two blowers to run efficiently. As a result a significant amount of energy was being wasted at the normal air flow rates.



After doing some research the City found several blower manufacturers that were building high efficiency, variable/high speed blowers. They visited several installations and contacted other users and then used that knowledge to write a performance specification that met their requirements. After reviewing the proposals from the qualifying bidders Sulzer-ABS was selected as the supplier of choice. The proposal submitted by Sulzer-ABS was not only the lowest capital cost but also had the lowest total life cycle cost. The City placed an order for two model 6000-1-L HST turbocompressor blowers that will replace four existing centrifugal blowers. The HST 6000-1-L

blowers are nominally rated at 200 HP and have a normal operating speed range of roughly 6,000 rpm to 22,000 rpm. Because of



the broad range of speeds the blowers can provide aeration over a very wide range of flows.

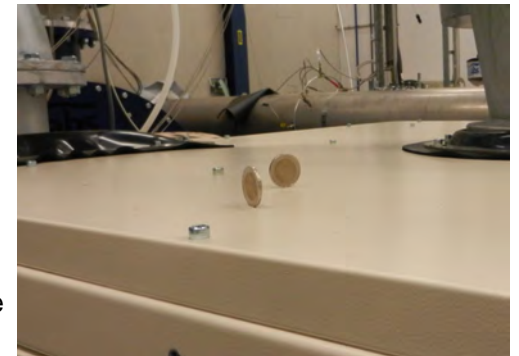
One of the key selection criteria was the oil free magnetic bearings used in these blowers. The magnetic bearings keep the motor rotor shaft levitating

and centered in the motor at all times so no contact is made. This minimizes friction, bearing heat and eliminates both shaft and bearing wear. The plant will also be turning the blowers on and off as oxygen demand varies, so it was looking for blowers with bearings that were designed for this type of service.



Final assembly of the blowers was completed at the end of August so, in early September, the Plant Operations Manager and Public Works Director from the City traveled to the manufacturing and testing facility in Finland to witness the performance testing of the two blowers.

The performance testing went very well and the blowers actually performed better than expected. The City is excited to get the new



blowers installed and operating so they can begin saving energy as soon as possible. The various pictures show the HST's during testing. In the one above, two coins can be seen standing on edge. This illustrates that the HST's have virtually no vibration even when operating at 22,000 rpm!

The city found the trip very beneficial and learned a lot from the test engineers and factory technicians. Because the city will be installing the blowers themselves the Plant Operations Manager and Public Works Director paid close attention to the handling and installation procedures the factory technicians used. After the performance testing was completed they were able to get all their installation and operation related questions answered. The City is looking forward to getting this phase of their project in operation.

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## Westwood continues

and was successful in getting all parties to utilize our design. Garco Construction was low bidder on the project and worked with Pumptech to provide an order for both packages.

The stormwater lift station incorporated ABS pumps and our unitary design. The unitary design places the valve vault inside wetwell for a complete and compact unit. The Wastewater lift station was much larger at 12ft in diameter and required, for transportation purposes, a separate valve vault and wetwell. The wastewater lift station incorporated Vaughan chopper pumps. The control panels for both lift stations were provided by L2 Systems. The pictures on the right show the two systems in transit from Canby, OR.

The project shows the full capabilities of Pumptech in providing engineering and design assistance as well as versatility to meet the projects demands and requirements. Start up was complete within the time frame allocated and the Westwood lift station was in operation at the start of the new 2012 School Year.

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## iRover 3G Connection Continues

one of our industrial clients. It never failed that when our client was at a site as far from his equipment as he could possibly be, some type of issue would arise that required him to make the 100 plus mile trek back to the site. Now with iRover Mobile HMI installed and running on a 3G router, our client can access his system anywhere he can get an internet connection.

This will potentially save him hundreds of hours and thousands of dollars each and every year that he is running iRover Mobile HMI on 3G. We expect to see many more of these installations in the coming months. Below is a list of the current iRover Mobile HMI connection options and the benefits of each .

Features	PLC Monitoring	Data Management	On Site Mobility	Remote Access*	Always Connected**
Local WiFi Router	✓	✓	✓		
Cable or DSL Internet Connection	✓	✓	✓	✓	
3G Modem	✓	✓	✓	✓	✓

\*(requires internet connection or 3G modem)

\*\* (requires 3G iPad or wireless hot spot)

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### MeterMan Injection Skid Features iRover 3G Connectivity for Off Site Control

The MeterMan skid shown in the picture below was designed and built for a major chemical supplier to the paper industry and will be used to inject polyaluminum chloride (PAC) during a paper



manufacturing process. This particular process required a reliable, non-metallic pump end with smooth, non-pulsing flow so Grundfos DMH dual diaphragm pumps were selected for the application. Pulsation dampeners were also incorporated to assure even smoother flow. Two pumps provide flow to two locations on the paper machine while the third

provides backup. The system also included a 6000 gallon, double wall storage tank and an ultrasonic level meter.



The control system incorporates PumpTech's touch screen display. It also includes our iRover mobile HMI and a 3G connection that will allow the chemical supplier to access flow trending, manage pump flow and track chemical inventory levels from remote locations.



### MeterMan - Sunshine Oil Sands Skids

The skids below were built for GE Water & Process Technologies who is providing a treatment facility for Sunshine Oilsands Ltd based in Calgary, Canada. The skids will be installed in the West Ells region of the Athabasca oil sands in northeastern Alberta.

The ones on the left are constructed on stainless steel containment basins and utilize "Tote Bins" for chemical storage. These tanks are DOT approved and can be filled and delivered by truck. The ones

shown are referred to as "mother" totes and have a capacity of 400 gallons.



The totes that are delivered fit on top of the mother tote and are smaller (250 - 300 gallons).

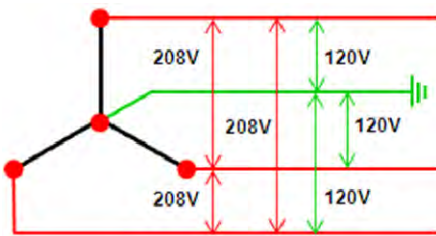
The skid below is used to inject an anti-foam solution and uses heat traced piping to keep viscosity at a consistent level. Both skids utilize Neptune diaphragm pumps with optional high viscosity heads.



## Pump Ed 101 – Beware of those Mutant Ninja Delta Transformers!

Joe Evans, Ph.D Education & Training

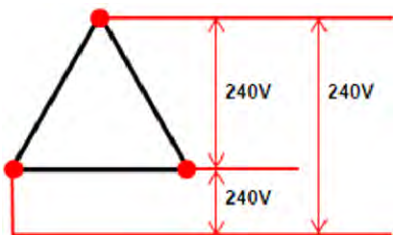
Three phase transformer windings are connected as Wye or Delta and there are four possible primary and secondary configurations. Delta/Delta transformers are typically found in large industrial applications. The Delta/Wye configuration is the most common and is found in smaller industrial and most commercial applications. Wye/Delta is used for high voltage transmission and Wye/Wye is rarely used due to possible harmonic and balance problems. Wye secondary's offer multiple voltages while a Delta primary provides higher reliability in case of a winding failure. The primary's and secondary's can be wound about a single laminated core or three, single phase transformers can be used. Both Delta and Wye secondary's are commonly used in pump installations.



The schematic on the left shows the various voltages provided by a Wye secondary. In this example the secondary is wound to produce

120V, single phase from each phase to the grounded neutral. Due to the phase angle the phase to phase voltage will not be twice the phase voltage. Instead it is 208V or 1.732 times the phase voltage. Wye secondary's can be wound for any phase to phase voltage including 460V or 480V. But, the phase to ground voltage will be just 0.577 that of the phase to phase voltage.

The schematic below shows the voltages provided by a Delta secondary. In this example the phase to



phase voltage is 240V which is double that of the individual phase voltages. The Delta secondary can also be wound for any phase voltage and the phase to phase voltage will

always be twice that voltage. Now, one might think that this is a more efficient design than the Wye since the voltage doubles but, the Delta's phase to phase current is just 1.732 that of the individual phase currents. The phase to phase current produced by the Wye transformer is twice that of the individual phase currents. Therefore we use the equation at the top of the right hand column to calculate power for both Wye

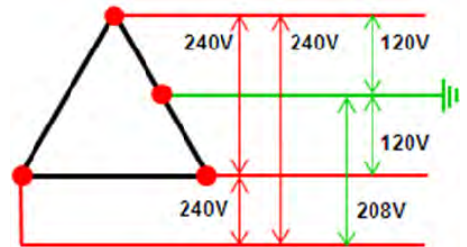
and Delta connections.

$$\text{Power (Watts)} = E \times I \times 1.732 \times \text{Power Factor}$$

The previous examples are typical three phase configurations found in pump applications. There are, however, several Delta mutants that can be problematic and the result will almost always be reduced motor life.

A mutant, that is becoming more common is the Center Tapped Delta.

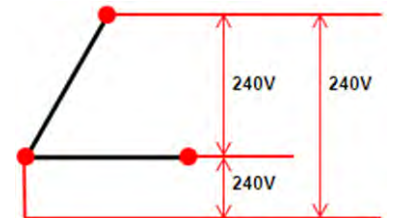
As seen on the right, this configuration attaches a grounded neutral to the center of one of the phase windings. The



phases on either side of the center tap provide 120V single phase but the phase on the opposite side produces 208V. If you accidentally connect a control circuit to this leg, expect to see some smoke! Also, unlike the Wye secondary, there are only two connections available for single phase loads. If too many loads are connected to one or both of these connections, voltage unbalance can occur in the three phase circuit. These transformers will provide balanced power as long as they are sized properly and single phase loads are accounted for during sizing.

The schematic on the right is that of an Open Delta secondary. Open Delta

systems employ two, single phase transformers to produce three phase power but, provide just 58% of the power produced by three, single phase



transformers. They are used by the electric utility for cost savings and are often seen in rural areas. Although the phase to phase voltage is the same as the standard Delta, they are prone to unbalanced voltage among the phases. A small voltage unbalance of just 2% can result in a current unbalance of 12% to 16%. When the voltage supplying a motor phase winding is reduced, current and temperature will increase and the result is reduced insulation life.

A VFD can be used to balance the voltage in

[Pump Ed 101 continues on Page 6](#)



## Replace Two Pumps and Reduce Annual Electrical Costs by \$175,000.00!

Mike Shoemaker, Moses Lake

Back in 2008 a leading manufacturer of potato products in Southern Idaho asked PumpTech to help them develop a plan for a more reliable high pressure pumping system for the plant's sanitation system. Due to the size of the plant and its many processes, the sanitation system is utilized 24 hours a day.

The original system utilized two, 250 HP pitot tube pumps supplied by a leading manufacturer of this equipment. The maintenance and energy costs had become so extreme that continuing with these pumps was not an option.

The plant engineer and PumpTech reviewed the current system design and layout. Over time there were changes and additions to the system that required the pumps to run at ever higher pressures. Eventually the pitot tube pumps were set up to run the system at 1200 PSI in order to meet the minimum pressure requirements at the most distant point.

Taking a holistic approach it was decided to design a looped system with strategic cross-connections along the loop. This design provides optimum utilization of the flow and pressure capabilities required to meet the sanitation needs. With the new design, it was determined that the maximum system pressure required would never exceed 700 PSIG.

With funding from Idaho Power, phase one involved the process piping changes. These were installed while the plant was running to allow for ease of cross

connections when needed.

Phase two involved the installation of two SIHI high pressure, multistage centrifugal pumps driven by 100HP motors. Both pumps were controlled by variable frequency drives which enabled them to match the system performance requirements while optimizing pump efficiency.



The system was commissioned in April of 2012 and, much to the delight of the plant, the redesign is so efficient that only one of the pumps is required during any sanitation cycle. The resulting power savings is in excess of 350 horsepower when compared to the old system which will result in a net power savings of \$175,000.00 annually. The deferred maintenance costs have already exceeded \$50,000.00. The total annual cost savings is expected to be around \$250,000.00. Nice payback!!

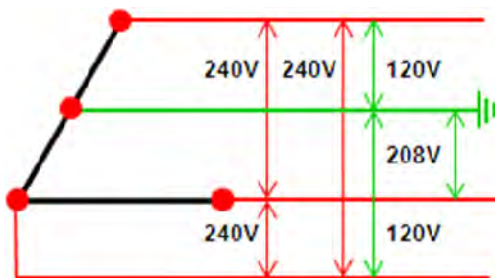
SIHI type MSH, multi stage pumps meet the specific requirements of many applications in the municipal, industrial, and process industries. Contact your local PumpTech representative for more information.

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## Pump Ed 101 – Mutant Ninja Delta continues

installations prone to unbalance but, the drive must be sized to accommodate the increased current. A DC choke may also be required to mitigate any harmonics that may arise due to the unbalanced impedance of the phase windings.

The worse case example of mutant Delta transformers is the Center Tapped, Open Delta seen on the right. This design combines all of the weaknesses of the previous mutants. Not only is it subject to voltage unbalance due to the use of just two transformers, it



also increases the probability of unbalance by providing two single phase connections on a single transformer. If this design powers a three phase motor and its single phase control circuit, it is always best to disconnect all other single phase loads.

Use caution when utilizing these mutants for three phase pumps. Measure and calculate the Open Delta voltage unbalance frequently and consider installation of a VFD if unbalance is greater than 1% in the three phase circuit. Make sure the single phase loads are balanced on the Center Tapped Delta and that unbalance in the three phase connection is 1% or less. If possible, avoid single phase loads on Center Tapped Open Delta transformers if the three phase load is 75% or more of the total capacity. If the two transformers are different sizes, the larger one should contain the center tap.

## PumpTech PumpChat - From the Presidents Desk - 2012 Trade Shows & Conferences

### Doug Davidson - Bellevue

PumpTech believes in supporting our customers and their industries by participating in their trade shows and conferences. We provide financial support by purchasing booth space and we also sponsor some events. But, equally important, we provide training that is preapproved for CEU credits in WA, OR and ID. So far this year we have participated in fifteen, including NWFPFA, WEFTEC, PNCWA, AWWA, WETRC and ERWOW just to name a few. PumpTech values the time these conferences give us to both educate attendees as well as display our current products and technologies.

The picture below was taken at the 2012 WEFTEC conference in New Orleans, the largest wastewater event in the US. Here we featured our Hydronix and MeterMan UL listed, packaged systems that we market to distributors throughout the US. All of the control panels were connected to our iRover mobile



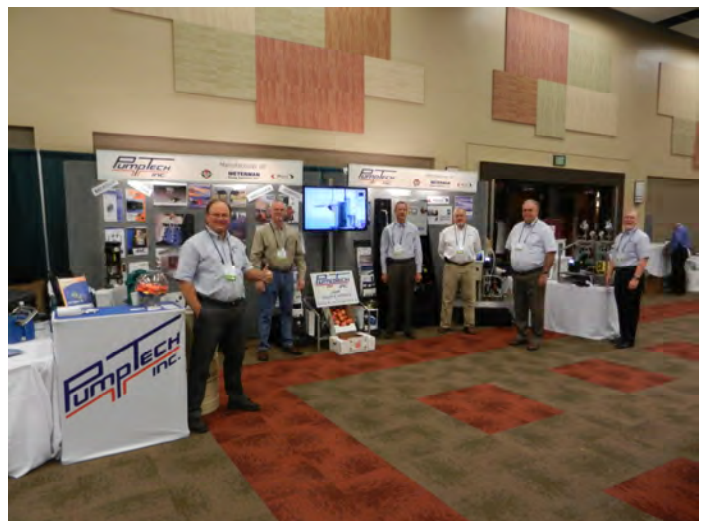
HMI. This allowed our booth personnel to access each one via their iPads.

In August, PumpTech and forty other manufacturers and vendors attended the ERWOW trade show and conference in Vancouver WA. This conference is held twice annually in WA and focuses on smaller utilities and municipalities. In addition to participating in their trade shows, PumpTech also provides CEU approved training at their short schools. The picture at the top of the right hand column shows our booth which won the prize for best display.

In October we participated in the fall PNCWA trade show and conference in Boise. Joe Evans gave a class on "Testing Pumps in the Field" and PumpTech had a 10'X20' booth exhibiting the latest in polymer make down systems, chemical dosing systems and



solar powered mixing technology. We also had our Hydronix and Vaughan demonstration trailers outside the exhibit hall showing how chopper pumps can chop up and pump everything from rope to hard plastics. In addition there were two major manufacturers that we represent exhibiting in the hall. The picture below shows our booth.



The PNCWA event brings to a close the 2012 tradeshows. The first conference in 2013 is the Northwest Food Processors show in Portland in January followed by ERWOW in Yakima in February. We have already begun planning for an even better presence in the 2013 shows. Next time you see our booth at a conference please stop in and say hello. We would welcome the opportunity to show you the latest products and technologies and learn how we can be of assistance in your area.

*Doug W. Davidson*



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- 12/12-14 WETRC Training - Kent
- 1/14-16 NWFPA - Portland
- 2/5-7 ERWOW - Yakima

