



Serving the Pacific Northwest

# PumpTech Pipeline

Providing Knowledgeable Solutions

## iRover - Cutting the Umbilical Cord

**Chris Suskie, Canby**

Late in 2010, PumpTech provided a packaged pump station for the City of Scappoose. They wanted an upgrade for their wastewater treatment plant and the consulting engineer required a pump station that could provide a continuous, variable flow from their existing clarifiers to a new filter station. Due to geological restraints the only available site was a narrow space between a road and previously installed process equipment.

PumpTech proposed a custom version of our model 421 submersible wet well. The package included an integral valve vault, aluminum lid with access hatches, safety handrails around the top perimeter and a jib crane for equipment removal inside the station.

There was, however, one small

problem that no one had considered.



That was the sun. In Oregon when the sun shines most people are extremely happy. But, at the new transfer station, the bright sun made the control panel's PLC touch screen display unreadable.

[iRover](#) continues on [Page 4](#)



## Airway Heights - Unique Design is a First for Washington

**Ed Smith, Moses Lake**

One of PumpTech's larger and most comprehensive projects during the past few years has been Airway Heights. Over the duration of the project we supplied packaged pumping stations & controls, eight wastewater pumps, three large end suction pumps, three multi-stage boosters and nine vertical, line-shaft turbine pumps. The picture on the right shows the triplex, Hydronix 421 sewage lift station, valve vault and flow meter vault after completion.

The City of Airway Heights planned a comprehensive project that would improve the city's sewage collection

systems and allow construction of a new wastewater treatment and water reclamation plant. Prior to 1995 all city residences and businesses were served by septic tanks. In 1993 they

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



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## Seattle Premium Outlets - Hydronix 421 with Above Ground Valve & Control Vault

Jim Joyce, PumpTech Bellevue

Seattle Premium Outlets in Tulalip, WA currently has 110 outlet stores and 8 food locations that are serviced by a gravity sewer system. A major expansion is under way but, due to the topography it cannot be connected to the gravity system.

Pacland Engineering provided the design for the mall expansion and asked PumpTech to design and stamp a lift station that would meet the requirements of the project and allow connections for several existing buildings.



PumpTech provided a custom version of its [Hydronix 421](#) system that was sized to the standards of WA state and the adjacent city of Marysville. We received an order on May 23rd and delivered and installed the packaged wet well on July 2nd. The station will come online in early August. The two photos on the right show the 421 during delivery and unloading.



The 421 system was designed by our licensed engineers in PumpTech's Canby OR office and built by our Canby manufacturing division. The wet well is 12 feet in diameter and 23 feet tall. Since this was an "oversized" load, special permitting and a pilot car were required for transport from Canby to Tulalip. Vaughan submersible, chopper pumps were selected for the system because of the mixed waste products that can occur in these outlet malls. The system was also outfitted with an odor suppression system since its location is adjacent to a nearby fast food restaurant and a new outside food court that will be constructed in the near future.



Usually our 421 systems include an integrated,

underground valve vault but it was decided that a [Hydronix 430](#) series above ground combination valve and control vault would be a better fit for this particular application. A photo of the 430 during construction is at the bottom of the left hand column.



The 430 series is a gull wing design that houses the discharge piping, gate and check valves and allows unrestricted access.



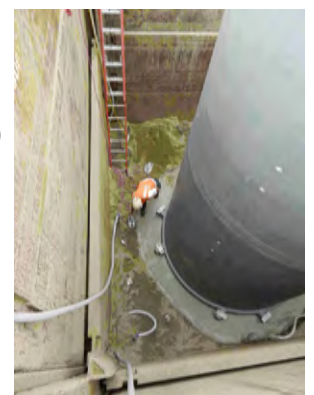
When the gull wings are open they provide the service technician with protection from the rain. It also houses the control panel, internal heater and ventilating fan.



The control system utilizes PumpTech's "Pump Down" control program and runs on a Unitronics V350 PLC. The PLC interface is a color, touch screen display. The V350 is also set up for on site mobility via PumpTech's [iRover](#). This will allow the mall office to monitor and respond to any alarms that may occur. It will also allow service technicians to perform tests without having to access the control panel.



The sequence of photos on the right show the 421 being lowered into the excavation. The bottom photo shows it being anchored to a reinforced concrete, anti-flotation pad.



The remainder of the components, including the 430 will be installed in late July. Once the invert and exterior discharge piping are installed, the system will be back filled and startup will be performed.

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## Airway Heights continues

entered into an agreement with the city of Spokane for sewage treatment and began construction of its own sewer collection system in 1995. By 2003 the ground water levels in their primary aquifer were declining, growth was unprecedented and future treatment charges by the city of Spokane were expected to increase significantly. After careful consideration they decided to construct their own waste water treatment and reclamation facilities and discharge to a reclaimed water system with ground water recharge. This type of treatment and reclamation facility is the first of its kind in the state of Washington. PumpTech was influential in the design and supply of the pump systems required for the different phases of design and construction .

Early on PumpTech worked with Taylor Engineering on the design of a sewage collection system to provide service to the new Qwest Casino and the surrounding community. A Hydronix 421 packaged sewage lift station was proposed and specified for this new facility. The station, the largest one ever built by PumpTech, was 12ft in diameter and 34ft deep. It included three 1500 gpm Vaughan chopper pumps, a Vapex odor control system and a complete control package. This lift station has been operating flawlessly for over 5 years. The top two photos show the 421 and the associated valve vaults during unloading. The photo on the bottom was taken during installation.

The next phase was the design and construction of the Waste Water Treatment and Reclamation Facility. PumpTech assisted Century West and Esvelt Engineering with the design of several of the pumping systems required. At bid time, in 2009, PumpTech was successful in working



with IMCO Construction to secure a contract for the majority of the pump equipment on this project. The various pump systems included Cornell mixed liquor, recycle pumps; Vaughan submersible chopper pumps; ABS plant drain & wastewater pumps; a Grundfos Boosterpaq reclaim water booster and all nine of the vertical turbine pumps used in the treatment and reclamation plants. The first four photos on the right show some of these pumps. The ABS plant drain pumps are installed in the wet well shown in photo 5. The bottom photo is an off site lift station that uses Vaughan chopper pumps.

The most recent phase includes a second offsite sewage lift station that PumpTech helped design. It will also use ABS submersible wastewater pumps. This station is in final construction and we look forward to startup by the end of July.

Overall, this project has been very rewarding and I have enjoyed participating over the years. Our relationship with the city, engineers and contractor has been excellent. I believe that it shows the resourcefulness of Pumptech in regards to our engineering support, manufacturing capabilities, system design and the quality equipment we always provide. For more info contact Ed Smith at:

[esmith@Pumptechnw.com](mailto:esmith@Pumptechnw.com)



## Cutting the Control Panel to Operator Umbilical Cord - continues

The control panel included a Unitronics V350 PLC and touch screen but, good luck reading it on a sunny day. Since this panel faces virtually due east, even overcast days made it hard to read. If you have worked around pumps or other equipment with a touch screen control system that is located outside, I'm sure you have run into similar issues. Sun glare, driving rain, panels located remotely from the equipment are just a few extenuating circumstances that can make a very nice installation not so nice to operate.

It was for these reasons that PumpTech decided to solve these types of control problems and, in doing so, unlocked a new age of onsite mobility and dynamic document management. I came up with the idea to put a PLC's HMI (Human Machine Interface) onto a mobile device after spending years of dealing with the issues I mentioned above. The result was iRover which runs as an app on the Apple iPad.

Many PLC manufacturers offer a remote access program that can be used on a laptop to connect to the PLC. The problem is most of these programs give you the data the PLC has collected and some ability to change the parameters of operation but the user experience is much different than standing in front of the control panel. The screens look different not to mention your lap top is not a touch screen.

My goal was to use a mobile device that more closely resembled the PLC's touch screen HMI so that an operator felt like he was holding the HMI in his hand. This would also give them the "onsite mobility" that effectively cuts the umbilical cord between control panel and operator. The Apple iPad was the best choice for making this happen since it is the most widely used tablet on the market today. Along the way we came up with several additional features and a second app for managing and sharing the important documents pertaining to the pump system. The two apps are called "iRover" mobile HMI and "docRover" dynamic document management.

iRover mobile HMI allows you to use your iPad to connect to the PLC used in your control panels and



works exclusively with any Unitronics V350, color touch panel PLC. iRover connects to the PLC via a local WiFi router which does not require an internet connection. We call this capability "Onsite Mobility". Onsite Mobility allows operators to move freely about their plant or station while monitoring or controlling the application. With Onsite Mobility they can actually watch the various parts of a process while maintaining full control of the PLC. Never again will they have to stand outside in the rain to access their PLC and, when the sun does shine, it will not affect the visibility of the iPad like it can on outside, panel mounted screens.



During the development of the iRover mobile HMI, I started thinking of all the other features that could be incorporated. Document management came to mind, so we created an additional app that handles this called docRover. docRover works directly with iRover to create a document management system unique to each piece of connected equipment. It is a dynamic system because the operator and the pump station manufacturer share important documents regarding the pump station. The documents in docRover are "cached", or stored, on the iPad for offline use. This ensures that the operator will always have access to schematics, O&M's, photos, spread sheets, word documents and pdf files that are pertinent to their equipment when and where they need it. iRover can be connected to as many V350 PLC's as the owner wishes and can be expanded to control future PLC's. This allows for a cost effective expansion when you decided to upgrade or add additional equipment. Options are also available that provide off site or remote access to each PLC.

For the city of Scappoose, iRover has solved a problem that did not have any other cost effective solutions. By placing the PLC's HMI on an iPad via iRover, the operators can control and monitor their filter lift station from any location in the plant. No matter how you cut it, iRover and docRover are paving the way to a more efficient work day for equipment operators and service technicians.

[Contact your PumpTech branch for more information.](#)

## Pump Ed 101– Corrosion, A Natural Process

Joe Evans, Ph.D Education & Training

Corrosion, like biological and organic decomposition, is a naturally occurring process. The question is not if it will occur - - it is how quickly. Steel, for example, is a man made material that is manufactured from iron ore (mostly iron oxides). Because energy is added during the manufacturing process the end product is unstable and, given the opportunity, it will follow the law of entropy and return to its natural state.

Corrosion is an electrochemical process that requires that several conditions be present if it is to occur. There must be:

[A supply of oxygen](#)

[An anode \(where corrosion occurs\)](#)

[A cathode](#)

[An electrolyte that permits the flow of ions and current](#)

[A conductive path for the return flow of current](#)

The anode and cathode are electrically distinct areas that exhibit properties similar to the poles of a battery. They may be different structures (i.e. two different pieces of metal) or they may be two different locations within the same structure. The anode is the location or structure that suffers metal loss during corrosion. An electrolyte can be almost any material that contains moisture. Air, water, soil, and concrete are but a few common examples. Its purpose is to provide a path for the flow of metal ions between the anode and cathode. It also provides a conduit for the electrical current that is generated by ion flow. The greater its conductivity, the better its electrolytic capability. Salt water, for example, provides a much better path for ion and current flow than fresh water and therefore hastens the corrosion process. In a similar fashion, the metal itself provides a return path for the flow of current from the cathode back to the anode.

Corrosion chemists refer to the different environments where these conditions can occur as “corrosion cells”. Three types of corrosion cells are common in pumping applications.

1) [Dissimilar metal cells](#) - Known as galvanic corrosion, these cells occur when two different metals contact one another in a common electrolyte.

2) [Dissimilar electrolyte cells](#) - This type of corrosion occurs when a single structure passes through an electrolyte of varying properties.

3) [Differential aeration cells](#) - These cells occur

commonly in soils where a single structure passes through areas of differing oxygen concentration.

Corrosion, if left unchecked, can be an extremely efficient and swift process. For example, a current of a single ampere flowing from a steel pipeline into the soil can consume twenty pounds of pipe in just a year’s time. Fortunately, it can be prevented if any one of the required conditions can be eliminated.

Probably the most common method of eliminating one of the required conditions is to coat the surface of a metal. A good coat of paint or epoxy can electrically isolate the surface of a metal structure from a potential electrolyte and therefore prevent it from corroding. Some of the epoxy coatings available today can make cast and ductile iron pumps quite corrosion resistant, even in salt water applications.

Another method of corrosion prevention that has been used for well over one hundred years is passive cathodic protection. I said earlier that it is the anode that suffers metal loss during corrosion. If we transform a structure that is normally an anode into a cathode and let some other structure become the anode, we can protect the original structure. Cathodic protection does this by adding a sacrificial metal that gives up electrons more easily than the metal to be protected and thus becomes the anode. This allows the original structure to undergo a major life change (to that of a cathode). The process is termed passive because current flow between the anode and cathode occurs naturally and is due to “galvanic” action. It is an example of a dissimilar metal corrosion cell and illustrates how we can use a normal corrosion process to selectively protect a structure that would otherwise undergo corrosion.

One of the most common forms of passive cathodic protection is the galvanized coating of zinc we find on sheet metal and steel piping. Since zinc is the less “noble” (looser electrons) metal, it becomes the anode and is sacrificed in order to preserve the primary metal. In submersible pump installations we can often attach a sacrificial anode directly to the pump body and achieve the same results as coating its entire internal and external surfaces. In either case the anode, depending upon its rate of decomposition, must be renewed periodically.

Another common form of cathodic protection is called “impressed current” cathodic protection. Instead of relying on a natural flow of current between the

[Corrosion continues on page 6](#)



## General Electric Oil Sands Skids - Scott Bush, MeterMan Division Manager

GE Water & Process Technologies is a loyal, long term PumpTech customer. They have relied on our MeterMan division to build prototypes of their injection system designs so they can be tested in their lab. In July, we shipped three chemical feed skids designed for caustic soda, anti-foam and scale inhibitors. They will be installed in a water treatment plant GE is building for Harvest Operations Corp of Calgary, AB. They will be used to treat the water used for steam injection in their oil sands operations. The top two photos on the right show the caustic soda skid. The photo on the bottom shows the anti-foam skid. All utilized Grundfos DMH series metering pumps.

The anti-foam and caustic soda skids are extremely susceptible to temperature changes and were designed and built to a different set of standards. Caustic soda, which is a 50% solution of sodium



hydroxide, can freeze between 50° and 60° F. On the other hand, the anti-foam liquid is not subject to freezing but its viscosity varies significantly with a change in temperature. Therefore all of the piping, fittings and other components had to be heat traced and covered with a sophisticated insulation system. The top photo on the right shows the caustic soda skid with the orange heat trace wiring installed. The middle photo is a close up of the insulation system.

The scale inhibitor skid in the bottom photo was far simpler and did not require heat tracing or insulation.

The pumps operate via variable speed control and manual stroke adjustment. The control panels are UL-508 listed and the complete skids are UL-49BJ listed. For more information, please contact Scott Bush, at

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## Corrosion continues

sacrificial anode and cathode, an external direct current is applied to both. The impressed current makes the anode, regardless of its nobility, more positive than the structure that is to be protected. An advantage of this method is that almost any conductive material may be used as an impressed current anode. In fact, materials with very low consumption rates are the most desirable since they require less frequent replacement.

In pumping applications, dissimilar electrolyte and differential aeration corrosion are found typically in connecting piping that is buried or in contact with an aqueous solution. In both cases a single structure (a length of pipe) contains both anodic and cathodic

areas. In a differential aeration cell differing concentrations of oxygen in the soil (the electrolyte) will determine which area is which. The section of pipe in soil with a good supply of oxygen (well aerated) will become the cathode and the poorly aerated section the anode.

In the case of a dissimilar electrolyte cell, variations in resistivity within the electrolyte can occur due to differences in chemical composition. The area of the pipe in contact with lower resistivity will become the anodic area. Corrosion protection for these systems is usually accomplished via coating, impressed current cathodic protection, or a combination of the two.

## PumpTech PumpChat - From the Presidents Desk - Summer Sun!

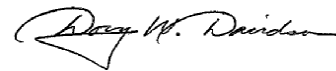
Summer sun and warm temperatures means that many of our customer's water supply pumps will be running around the clock to keep up with summer demands for irrigation, lawn watering, car washing and filling up the kid's pool. It also means that our service department is busy with their 24/7 on call services to assist customers that may have issues with their pumps during the high demand season.

This summer issue highlights a number of our manufactured products including the iRover mobile HMI (human machine interface), packaged pump stations with fiberglass wet wells and our packaged chemical injection skids that are used for both municipal and industrial applications. With the Airway Heights station fiberglass wet well measuring 12' diameter and 34' deep it is one of the largest fiberglass wet well packages ever produced and the Seattle Premium Outlets package is an indication of the quick response time we can provide. The advantages of a Fiberglass wet well are vast - - no deterioration from Hydrogen sulfide gases; easy to

clean; bright on the inside due to the white, gel coated interior and quick installation. Operators are always impressed with how these stations look, operate and the low maintenance compared to a concrete wet well.

Even though the Northwest is in the peak of summer, we are preparing to exhibit our equipment at WEFTEC (Water Environmental Federation Technical Exhibition and Conference) in New Orleans at the end of September as well as the PNCWA conference in Boise in October. We hope to see many of you at either or both events where we will be giving away an iPad which interfaces seamlessly with our iRover mobile HMI.

Our all too brief Northwest summer is here and hopefully your pumping equipment is happily pumping away but, if it is not, we are available 24/7/365 days a year to assist.

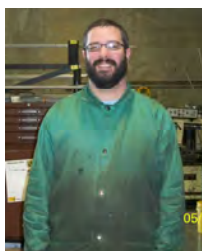


### New Employees at PumpTech Canby & Moses Lake

**Millie Borg** - Millie joined PumpTech in June as our new receptionist in the Canby office. Also known as "Director of First Impressions", her position is a very important one. Millie and her husband Phil have four grandkids that keep them very busy but make their life complete.



**Tim Neff** - Tim joined our Canby manufacturing team in April as a welder. He has over ten years experience in various fabrication shops. He and his wife Jennifer are the proud parents of a new son. When not working at PumpTech, Tim enjoys hunting, fishing, camping and playing the guitar.



**Scott Pezl** - Scott joined our Canby manufacturing team in April as an assembly technician. He has been in the pump repair trade for over twenty years. His fifteen year old daughter loves cheerleading and riding horses. When not working at PumpTech, he enjoys fishing, hunting and riding his dirt bike.



**Jeff Woods** - Jeff joined PumpTech in Moses Lake last August as an inside sales and support person. He is a thirty year resident of Moses Lake and lives with his wife Jennifer and son Brennan. When not working at PumpTech, Jeff enjoys playing softball and refereeing local high school basketball. He is also learning to play golf (see below).



### Boise Paper Solutions Golf Tournament

The annual Boise Paper Solutions golf tournament was held at the Canyon Lakes golf course in Kennewick on Friday, June 29th. PumpTech, Moses Lake was both a sponsor and a participant. The team included Jeff Woods, Mike Shoemaker, and Nathan Stark. Mike reported that Jeff and Nathan's putts were pretty incredible and that Jeff sank one from over 60 feet away! They finished the tournament at 8 under par and secured second place. Good job boys!





## PumpTech Pipeline - Summer 2012

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### Upcoming PumpTech Participating Events

- 8/13-14 Vaughan Training - Factory
- 8/22 Vertical Turbine Pump Training - Medford PUD
- 8/28-30 OR Operators Conf - Seven Feathers Canyonville
- 8/28-30 ERWOW Conference - Vancouver
- 9/10 Snoqualmie Wastewater Training - Snoqualmie PWD
- 9/13 WETRC Training - Green River CC
- 9/17-19 Cornell School - Portland
- 9/19-21 WASWD Conference - Spokane
- 9/30 - 10/3 WEFTEC Conference - New Orleans
- 10/21-24 PNCWA - Boise

