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Serving the Pacific Northwest

PumpTech Pipeline

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Hydronix Supports Our Navy Seals, Carriers & Helicopters

Dave Bisbee
Barrett Engineered Pumps, San Diego

San Diego, CA is a military town and the Navy and the Marine Corps have several bases located in and around the city. These include the 32nd Street Naval Station which is the largest Naval Base on the West Coast, Miramar Marine Corps Air Station of "Top Gun" fame and the Naval Amphibious Base where Navy Seal Teams train. The Hydronix 185 Self Priming station shown on the left is installed in the Seal training area on Pier 5.

Located just north of the Hotel Del Coronado on beautiful Coronado Island is the North Island Naval Air Station (NASNI) home to the Aircraft Carriers USS Ronald Reagan and Carl Vinson as well as the Navy's deep submergence vehicles Mystic and Avalon.

John Sudol is the Civil Utility Engineer for NAVFAC (Naval Facilities Southwest Division) and is in charge of the sewage lift stations on NASNI.

US Navy continues on Page 3

Cornell Introduces Cutter Pump Line

Ed Smith, PumpTech Moses Lake

Cornell Pump Company (Clackamas, Oregon) is adding a new line of cutter pumps to its wastewater pump offering. The project began early last year and should be complete by the end of March. The initial offering will include non-clogs from 6 to 12 inches. The cutter assembly will also be available as a retro-fit kit that can be field installed on existing pumps.

The city of Caldwell, Idaho was chosen for the first field trial. In June of 2011 Ed Smith and Shane King of PumpTech met Jon Ylvisaker of

Cornell at the Caldwell pump station and installed a retro-fit kit on an existing 6NHTB. Ed and Jon are shown above prior to removal of the pump. The upgrade was simple and

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Elwha River Pump Station - Dams Away !

Doug Davidson, PumpTech Bellevue

PumpTech is involved in two projects in the Lower Elwha region just outside Port Angeles, WA. This article deals with the project to prevent flooding of the homes at the mouth of the river. The other project provides a vacuum sewer collection system for all of the homes. We will feature that project in a future newsletter.

The headwaters of the lower Elwha come out of the pristine Olympic National Park and feed two reservoirs that were created by hydroelectric dams. The dams were constructed to provide electricity to the growing Northwest in the early 1900's. The Elwha dam was built in 1914 and the Glines Canyon dam was completed in 1927. At that time no provision was made for salmon to navigate the dams and return to their native spawning grounds. The cost of retrofitting the dams with fish ladders was prohibitive so it was decided to remove the dams and allow the river to run free. Removal began in the late summer of 2011.

The mouth of the river is home to the Lower Elwha Klallam (The Strong People) tribe and consists of about 300 houses. The river had silted up over the years and there was great concern that when the dams were removed, the area could be subject to flooding if there was a high tide surge when the river is full. The US Army Corps of Engineers (USACE) was tasked with finding a solution to the potential flooding that could occur until the river scours out its bed and deepens the path to the ocean. They designed a pumping system incorporating 3 large vertical turbine pumps located within the reservation and beside the river near the new tribal fish hatchery.

PumpTech and Morrison Pump received the order from Watts Constructors for the 3 pumps. Each 300 HP pump is capable of pumping 69,700 gallons of water per minute from the flooded area over a berm and back to the ocean. The pump construction was unique and utilized a horizontal motor mounted vertically with a belt drive system.

The space requirements were challenging with caissons and support structure requirements for seismic forces. Morrison's unique design eliminated the lower bearing in the pump bowl allowing the suction bell to be removed and tilted to clear the support structure and then be easily reconnected to the bowl assembly. In addition the Morrison pumps had to go through a rigid dynamic analysis to make sure they would not create any harmonic vibration throughout the support structure as well as operate during a seismic event. Morrison

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US Navy Hydronix Systems continues

Over the past two years he has installed three Hydronix 185 self priming lift stations. The most recent station (seen below in the shop) was designed to off-load the aircraft carriers that dock at Juliet pier after they arrive in port. This is their largest station and will handle the outflows from the Carriers' holding tanks. The two Hydromatic self primers are designed to deliver a maximum flow of 2200 GPM @ 122' TDH.

John takes good care of his customers. He listens to the needs and requests of his maintenance people as he knows that they are the ones who are responsible for keeping the systems in working order. James "Junior" Hein and Robert Hughes are his two, most experienced maintenance personnel and both favor the Hydronix gull-wing design that gives them easy access to the pumps, motors, valves and controls. They also like Hydronix's touch screen level controller and it's user-friendly interface. In the future, as their existing systems wear out and new projects arise we will have the opportunity to quote on more of the 185 stations. The 185 below is installed at the Imperial Beach NOLF helicopter training field.

Barrett Engineered Pumps is the Hydronix distributor for San Diego County. www.BarrettPump.com

Cornell Cutters continues

required just a new "cutter" fitted impeller and suction plate. The photo on the right shows Shane removing the existing impeller. The new impeller and suction plate are shown in the pictures in the right hand column. From start to finish the total retro-fit took less than six hours.

This test pump was installed in a underground, dry pit station manufactured by Dakota Pump and supplied by PumpTech. It had a history of ragging due to the make up of the wastewater entering the pump station. Since the retro-fit, it has not experienced any ragging or plugging and the pump operates at its design point.

In the past ten years, ragging has become more of an issue in the wastewater industry. Materials such as non-dissolving paper towels and flushable mop pads are two of the culprits but, VFD's can also play a role. If wastewater pumps are run too slowly the low suction entrance velocity can lead to the build up of stringy material at the impeller vane entrances. Cornell's new cutter pumps and field retro-fit option will increase the overall efficiency of problematic pump stations by decreasing both down time and the man hours required to clear these blockages. Contact your local PumpTech branch for more information.

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Maintenance Tips

Understanding Pump Vibration

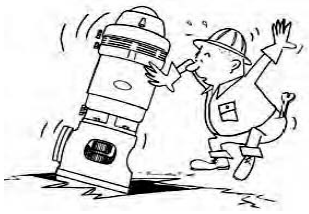
Ed Smith, PumpTech Moses Lake

In the Fall 2011 edition of Pipeline I explained how trending your pump equipment will enable you to detect potential problems in time to schedule repairs and avoid costly catastrophic failures. Regular trending at predetermined intervals will help reveal changes in specific parameters that will help indicate reductions in pump performance and operation before pump failure occurs. Both mechanical and hydraulic changes can be evaluated and corrective measures implemented to address any problems on a planned basis. One of the most essential tools for trending equipment is the use of a vibration analyzer that can provide valuable information associated with the operation of the equipment.

Considered the cornerstone of predictive maintenance, vibration amplitude and frequency can predict impending equipment failures. It can reveal mechanical imbalances, critical speeds and harmonics. Changes in vibration trended over time are more meaningful than a single "snapshot" of the vibration spectrum and should be part of any predictive maintenance program.

Excessive equipment vibration can cause premature component failure unless the root cause of the source of the vibration is corrected. Simply replacing failed components caused by excessive vibration will only buy time and the same components will most likely fail again. An understanding of the key symptoms of both hydraulic instabilities and premature mechanical failures can help maintenance detect impending failures and plan accordingly.

Pump vibration underscores the fact that a pump is only a part of an overall system. The search for the causes of vibration and remedies must encompass the entire system to properly correct the problem. Many of these problems involve the mechanical nature of the pump but hydraulic instabilities are just as common. Careful attention to the complete system when troubleshooting is needed to assure that the pump is operating near the manufacturers best efficiency point (BEP). It is important that the pump not be operated at excessive or reduced capacities. Pumps operated at flows significantly greater or less than BEP will cause vibration and premature component failure. As a rule of thumb, the pump operation should not exceed 20% of the BEP both for minimum and maximum flow rates. Some pumps, however, can exhibit vibration due to cavitation and suction recirculation when operated at 10% off BEP flow. See "Suction Specific Speed Revisited" in the Summer 2011 edition of Pipeline for more information on this topic.



The system approach involves the consideration of both hydraulic and mechanical aspects of design and construction. Both are interrelated and are difficult to evaluate or correct without a thorough understanding of both when assessing the vibration data. Once again, trending your equipment and utilizing a vibration analyzer can help you more accurately evaluate and troubleshoot your equipment to determine the root cause of the vibration problem and schedule maintenance accordingly. Below is a list of the top vibration related pump problems.

- **Improper suction conditions - Low NPSH**
- **Pump recirculation**
- **Operating at excessive or reduced capacities away from BEP**
- **Improper alignment**
- **Improper coupling selection and/or installation**
- **Improper foundation and base**
- **Improper grouting**
- **Improper anchoring**
- **Improper pipe support resulting in pipe stress on the pump**

According to the Beach Boys there are often good vibrations that can lead to excitations. But when pumps are involved, vibrations and the excitations they cause are always bad.

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Pump Ed 101– Wastewater Pump Draw Down Calculator

Joe Evans, Ph.D Education & Training

Flow meters are becoming increasingly popular in many wastewater applications but it is often difficult to justify their cost in smaller lift stations and those that are not connected to a SCADA network. Up here in the Northwest, the vast majority of these stations use "Draw Down" as the standard pump test technique. This testing method can be very reliable as long as the data collected is accurate and the test is repeated several times to insure reliability. Often, a draw down test is used to measure pump flow rate and then flow rate is used to determine where the pump is running on the H/Q curve. But, flow rate alone may not provide all of the needed information. Total Dynamic Head (TDH) should also be measured if we are to assess the true performance of a pump.

Below is a screen shot of my Draw Down Calculator which is available as and Excel spread sheet on the "Resources" page at Pumptechnw.com. It provides a standard procedure for testing submersible and above ground wastewater pumps when a flow meter is not available. Detailed instructions are located at the bottom of the spread sheet. An alternative version is also available for older wells that use a partition to accommodate both wet and dry pits in the same well. The calculations take into account the elevation difference between the "pump start" water level and the gauge position. They also include the suction and discharge velocity heads in the TDH calculation.

For improved accuracy make sure you follow these rules. 1) Shut off the invert during testing. 2) Use a calibrated gauge that shows the "pump start" pressure at mid range. 3) Keep the draw down distance close to one foot in order to keep the calculated average flow near the "pump start" flow. 4) When testing submersible pumps, make sure they remain submerged during testing. Once you have the calculated TDH and flow, it can be compared to the expected operating point on the pump H/Q curve.

Testing wastewater pumps at least twice a year will reveal changes in operating conditions due to changes in system conditions and pump wear. It will also alert you potentially damaging off BEP operation.

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WASTEWATER PUMP DRAW DOWN CALCULATOR

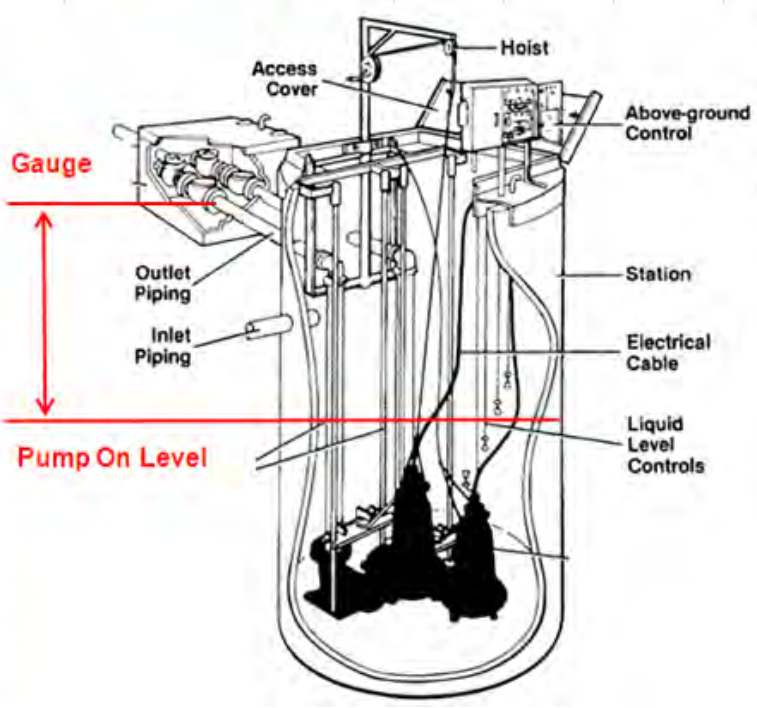
PumpTech Inc.

INPUT DATA

Wet Well Diameter (inches)	96.0
Pump Down Distance (inches)	12.0
Pump Down Time (seconds)	40
Discharge Gauge Pressure (PSI)	25.0
Gauge Location to Water Level (inches)	108.0
Pump Suction Diameter (inches)	5.0
Discharge Pipe ID @ Gauge (inches)	4.0
Wet Well Discharge Pipe OD (inches)	5.0
Number of Wet Well Discharge Pipes	2

CALCULATED RESULTS

Wet Well Volume / Foot (Gal)	374
Draw Down Volume (Gal)	374
Flow Rate (GPM)	561
Discharge Velocity @ Gauge (ft/sec)	14.3
Discharge Velocity Head (ft)	3.2
Suction Velocity (ft/sec)	9.2
Suction Velocity Head (ft)	1.3
TDH (ft)	68.6
TDH (PSI)	29.7



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Alaska Fire Pump System - Design, Build, Test, Shrink Wrap & Ship !

The fire pump package shown below was built for SNC-Lavalin Constructors for installation in the SOUTHCENTRAL POWER PROJECT in Anchorage Alaska. It consisted of a 150HP Peerless fire pump, 3 HP Grundfos jockey pump, Factory Mutual control system, valves, backflow preventer, gauges, fittings, piping and pipe supports. The entire system was fabricated on a epoxy coated, foam filled steel base and was enclosed in a modular, insulated foam pump house. Interior lighting and heating was also provided. The entire pump house was shrink wrapped prior to shipping to protect it from potentially harsh shipping conditions. It went by truck from Canby to Seattle, then by barge to Whittier Alaska and finally by railroad to Anchorage. Fortunately, it arrived in one piece!!






MeterMan Builds Skids For Power Plants In Peru & California

One of four large Phosphate, Amine, Biocide and Sodium Bisulfate skids for SNC-Lavalin. These will be installed in the Fenix Power Combined Cycle Power Plant in Chilca, Peru south of Lima.

One of three stainless steel chemical injection skids for the Russell City Energy Center wastewater reclamation facility in Hayward, Ca.


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PumpTech PumpChat - From the Presidents Desk

Giving Back To Those We Serve

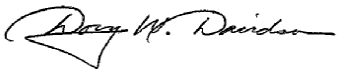
Having exhibited in January at the NW Food Manufacturing & Packaging Expo in Portland in January and preparing to leave for the Evergreen Rural Water of Washington conference in Yakima in February I am reminded of all that PumpTech does to support our industry and customers. In 2011 we participated in twenty three of these events in WA, OR, ID and MT. We expect just as many this year.

By exhibiting at these shows we support the organization not only with the fees we pay for the exhibit space but also by providing valuable one on one time with customers, managers and commissioners to bring them up to date on the latest products and technology. We also contribute by providing speakers at these shows who present seminars that give attendees the valuable CEU's needed to maintain their credentials. PumpTech also provides these same educational opportunities directly to customers by coming to their site and offering over twenty topics that are preapproved for CEU's in WA, OR and ID. Many have found that during these hard financial times it is much more cost effective to have us come to their site rather than have their staff travel to a distant location for training. Some also invite neighboring districts to attend at the same time and thus share the cost.

PumpTech is committed to our industry and as such we regularly support the organizations that are active in the Water, Wastewater , Food Processing, Water Treatment, Chemical Processing, Timber and Pulp & Paper industries. We have always been committed to being a solution based provider to our customers and as such we work with them to find new and novel ways to solve problems, reduce maintenance costs and reduce energy consumption. This past year as a team member on one of our larger customer's Continuous Improvement Process Program (CIPP) we recommended improvements in both equipment and processes that will result in almost $1M of savings when implemented.

PumpTech takes pride in supporting our industry and our customers which is why one our mottos is:

"Thanks for the opportunity to be of service"



Northwest Food EXPO

In January PumpTech was one of over 400 exhibitors at the 98th annual Northwest Food Manufacturing & Packaging EXPO at the Portland Convention Center. With over 4000 attendees, this three day event is the largest regional food show and conference in the US. This show is a very important venue for PumpTech because the food processing industry is the second largest consumer of our products and services. The booth was manned by Mike Shoemaker, Pumptech's industrial sales manager and our regional industrial sales reps - - Jason Green (Moses Lake), Darrell Giger (Canby) and Steve Manwell (Bellevue).

Elwha River Pump Station - continues

Pump provided the study of the intake structure to assure proper operation under the most difficult conditions and a Physical Hydraulic Model Study (PHMS) was performed by the Clemson University Hydraulics Laboratory.

The equipment was built and factory tested in Florida and delivered on time which allowed installation in the late summer. The USACE would not allow the removal of the dam structures until the pumping system was installed, operating and providing protection to the tribal area. Meeting this critical deadline was imperative to allow the removal of the dams before the heavy fall and winter rains. PumpTech worked diligently with both Morrison Pump and Watts Constructors to make sure the equipment was suitable for the task and delivered on time.

Demolition of the dams began on 9/27/11 and is scheduled for completion in 2012. The Lower Elwha Klallam can now relax knowing that the Morrison pumps provided by PumpTech Inc are standing by and ready to pump 209,100 GPM of flood water if needed. And, we hope the Lower Elwha soon will be teaming with salmon returning to there spawning grounds on the river.

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2/7-9 ERWOW Conference, Yakima

3/11-13 AWWA Short School, Eugene

3/26-28 AWWA / PNCWA Short School, Ontario

3/26-29 WOW - WETRC, Spokane

3/29 Clackamas Short School, CCC

4/11 SWIOS Training, Garden City

5/3-4 PNWS / AWWA Conference, Yakima

5/10 Professional Engineers of OR Conf, Eugene

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