MTS SENSORS

Direct Data Technologies (DDT)

CUSTOMER CASE STUDY

Improved Cold Well Efficiency from Remote Monitoring

MTS, partnered with DDT, enables oil companies to improve cold well efficiency and save money through remote monitoring of water and oil levels.

"Level Plus level transmitters were a perfect fit for this application. The ease of installation, low maintenance and high accuracy are ideal for the oil and gas industry, which measures success by efficiency and productivity."

- Dean Schlekewy
President, Direct Data Technologies

DIRECT DATA TECHNOLOGIES INC.

CUSTOMER CHALLENGE

Thousands of dollars each year are lost through inaccurate data reporting regarding water and oil levels in cold well heads, which can lead to watered out wells and inefficient truck routing.

Watered Out Wells

The phrase "watered out well" is a term used to describe an oil well with oil, water and sand in the reservoir that breaks over to 100% water, a result of pumping too fast plus water and oil viscosity characteristics that affect the flow of fluids. Oil is lighter than water but it does not flow as freely due to its higher viscosity and thus, when the pump is pumping too fast the water will flow faster to the well bore than the oil. On the other hand, if the pump is not pumping as fast as the well will allow then the well is not operating as efficiently as it could be. The oil companies must maintain a balance between efficiency and damaging the well. Once a well becomes watered out, it may never return to producing oil, therefore resulting in a large loss for the oil company. A common cause of a watered out well is a company's inability to remotely monitor real-time data of oil and water levels being produced at the well head. To compound the situation further, cold well heads are at greater risk in areas such as the oil fields of Lloydminster, Canada due to the formations in the area consisting of oil, water and sand.

Wasteful Truck Routing

Wasteful truck routing occurs when a truck drives to a single well tank battery to fill up with oil but is forced to pick up a load of oil mixed with water, resulting in lost revenue due to lack of knowledge and anticipation of past production history. This event occurs when the oil company operates without real-time data to assist with scheduling trucks and emptying tanks. Commonly, trucks are scheduled based on prior output over the life of the well and not based on the current tank level; this can lead to excess trips when the tank level is not conducive to draining. This situation can be prevented through the use of a tank level system that reports data in real-time, however, most tank level systems cannot differentiate between oil and water levels that make up the overall tank level. Miscalculation in oil and water levels also lead to wasteful truck routing, resulting in a truck that may take oil with them in a load of water to be disposed of at a water disposal. This is not only wasteful trucking but also costs the oil company more money in lost production. This could potentially make or break marginal wells.

THE MTS SENSORS AND DDT SOLUTION

The Optiview remote monitoring system, produced by Direct Data Technologies (DDT), is capable of allowing a user to interface with the system from any where in the world via a secure internet login. The user is able to see not only how much fluid the well has pumped but the actual oil and water levels. The Optiview system also allows the user to trend the levels over time to determine the most efficient pump speed for producing oil from the well. It also gives you the capability of having text message alarms when clean loads of oil or water are ready to haul.

The foundation of the Optiview remote monitoring system is the Level Plus® liquid level transmitters from MTS Sensors. The Level Plus Model MG was selected for its ability to provide accurate and reliable 3-in-1 measurement.

Level Plus®

In Direct Data Technologies' case, it is now a 4-in-1 measurement with the ability of the Model MG level transmitter to measure the oil level, water level, tank temperature and sand level from one tank opening. Combining the measurement of all four process variables into one field device enables the Optiview system to minimize cost, setup and maintenance.

DDT has been installing the Optiview system with Level Plus level transmitters for over three years with much success. "Level Plus level transmitters were a perfect fit for this application," said Dean Schlekewy, President of Direct Data Technologies. "The ease of installation, low maintenance and high accuracy are ideal for the oil and gas industry, which measures success by efficiency and productivity."

CUSTOMER BENEFITS

Pump Optimization

The Optiview remote monitoring system provides continuous updates of both oil and water production of the well for a more efficiently operated well. By monitoring the real-time production of the well, the oil company is able to adjust the pump speed via the Optitrol pump-off controller. A pump-off controller is installed on cold oil wells to adjust the pump speed and allow the pump to pull as much fluid as possible while pumping as efficiently as possible. In most instances, the pump may go faster and produce more fluid but this does not necessarily translate into the well producing more oil. With the assistance of the DDT controller, the user can take a sample every five minutes to see how much water and oil is being produced. This real-time data permits the operator to decide if the pump needs to be sped up or slowed down based on real-time production. The operator can also select an automatic mode and the onsite PLC can monitor your oil cut adjusting speed based on oil production and pump efficiency.

For example, if a well is producing 100 barrels a day of fluid at a normal pump rate it could produce 120 barrels a day at a slightly higher pump rate. The question that remains is what percentage of the fluid is oil and what is water? The increase in the pump rate could actually cause a decrease in oil production due to the nature of the oil and cause the well to become less efficient. With the Optiview system, the oil company would know what percentage of the increase in fluid was oil or water and can determine if the increase in pump speed was beneficial or not. The goal is to adjust the pump speed and find the speed that results in consistent oil production with minimal water production, resulting in longer pump run times, less equipment maintenance, and longer life for the well bore.

Efficient Truck Routing

The Optiview remote monitoring system also provides inventory feedback to verify when a tank is full and a truck needs to be sent to empty the receptacle. For example, if a well historically produced 180 barrels a day, the oil company would schedule a truck to arrive every morning to pick up a full load of oil. If there was a problem with the well and one morning there was only 150 barrels of oil, the trucking company might still arrive and take 180 barrels of fluid but only 150 barrels would be oil. Most trucking companies are third party operators contracted to leave the site with a full load without knowledge of what the fluid contains. Consequently, any partial truckload of oil is not as profitable to the oil company as a full truckload. To illustrate this point, the oil company in this example would be short 30 barrels of oil for a loss of over $2000, depending on the barrel price. With the Optiview system, instead of a scheduled pick-up, an email or text alarm can be dispatched to the trucker or trucking company once there is a full load of oil and optimize the value of every truckload that leaves the well.

Oil companies are learning the value of remote monitoring systems to optimize well production and scheduling of truck routes. Several oil companies have selected DDT and their Optiview remote monitoring system to provide real-time feedback and allow monitoring of the oil level, water level, temperature, and other critical parameters from a secure web-based interface to efficiently control their wells. The remote monitoring system provides an instant return on investment when compared to the risk of watering out wells and inefficient truck routing.

Direct Data Technologies is actively developing the use of the Level Plus Model MG to become a 5 in 1 device monitoring the oil level, water level, tank temperature, sand level and also foam level. The addition of the foam level float will give the user visibility of the foam level and help reduce foam overflows and costly clean ups.

About the Authors:

Direct Data Technologies (DDT) specializes in well optimization via single-well remote monitoring systems that provide oil level, water level, and other crucial data to help oil companies operate their well heads more efficiently.

MTS Sensors, a division of MTS Systems Corp., is the global leader in the development and production of magnetostrictive linear-position and liquid-level sensors.

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